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ORIGINAL COMMUNICATIONS.

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CONSTITUTIONAL DEAFNESS.
AN ANALYSIS OF CASES.

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This report consists of an analysis of 13 cases of deafness which are progressively becoming worse. As is shown in Chart I, all of these cases have several things in common, namely, the Wassermann is negative, the lower tones are elevated and the Rinne is negative. In all but one case there is an associated definite disturbance of some other parts of the body. Seven of these have symptoms referable to the stomach and intestines. In all but one case there is a contraction of the visual fields, either universally or colors alone. Out of the 13 cases, nine are females. The age of onset, except in two cases is between 21 and 28 years of age, and the two cases in exception had their incipiency at the age of 46.

The method of examining the ear, of plotting the visual fields, and obtaining blood for blood chemistry estimation is the same as described in the author's article entitled, "Contraction of the Visual Fields in Cases of Progressive Deafness", published in the Archives of Otolaryngology, July, 1928, Vol. 8, pp. 12-25. Constitutional deafness is defined in an article under the title of, "Constitutional Deafness", published in THE LARYNGOSCOPE, St. Louis, May, 1928.

We will now analyze this report in accordance with the following items:

1. Heredity.
2. Variability of the result of hearing tests.

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3. Universally contracted visual fields.
4. Contraction of color fields alone.
5. Abnormal uric acid blood figures.
6. Low calcium blood figures.
7. High calcium blood figures.

Heredity: As is shown in Chart II, six of the 13 cases compiled in Chart I have a heredity history of deafness, in some cases quite pronounced, and in others, rather indefinite. All of these six cases present very definite abnormalities of other parts of the body. The visual fields are contracted in all of them. All but two of the cases have abnormal calcium figures, and three of the cases have abnormal uric acid figures. The important consistent findings which apply to every case in this group are disturbances in other parts of the body, contracted visual fields, elevation of the lower tone limit and negative Rinne, but this is also found in the cases that do not have a hereditary history. In considering the subject of the incidence of deafness in other blood relatives, it is wiser to err on the side of leniency than to assume the attitude that this condition is hereditary because one at once feels that there is a futility to do anything about this condition if it is believed to be hereditary. The idea of heredity either in sickness or in the determining factors of physical makeup or mental equipment is something which we as yet are not able to alter. If we accept the theory that progressive deafness is hereditary, our enthusiasm for research in this field is immediately dampened.

Let us assume it not to be hereditary, but consider that environment may be a potent etiological factor. The human organism enters this life, as St. Augustine puts it, *inter faeces et urinam,* and is immediately infected with the bacteria of the intestinal and genito-urinary system of the mother. In six or eight hours the child is suckled and exposed to the skin flora of the mother. In due time the mother and father and others relatives contribute their portion of bacteria to the mouth and respiratory tract by means of osculation. The method of preparing food is usually handed from mother to daughter through generations. If the family's economic condition remains the same for a considerable length of time the question of general environment, such as sunshine, ventilation, cleanliness and sufficiency of rest and mental state (contentment or disquiet), assume importance. If, however, there is an improvement in the economic condition of the family, the only change that occurs is the general and mental environment, rather than the personal. With such potent factors as those enumerated, why is it not possible for similar bodily ailments to develop in one family, as compared to other families having no such maladies? Bearing this in mind, we feel that the path

of the investigator in the field of research on this important and difficult problem is made easier.

Variability of the Result of Hearing Tests: It will be noticed in Chart I that the bone conduction is not prolonged in all the cases. The information entered in the chart on this subject is that which was elicited on the first examination. In some cases the hearing was so bad that the bone conduction has also undergone deterioration. In others, the bone conduction was not prolonged at the first examination but was manifest at subsequent investigations. In Chart III will be found a record of eight of the patients who have been under observation for a sufficient length of time to have obtained hearing records from time to time. It gives the distance at which the patient can hear ordinary conversation, the number of seconds the patient can hear the 256 D.V. fork by air and bone conduction, also in five instances the result of the Gelle test. This chart was compiled for the purpose of showing the variability in the results of the hearing tests on the same patient when taken at various intervals. It also clearly demonstrates that an opinion cannot be based on the result of one examiantion. Your attention is particularly called to M. L., wherein the bone conduction changed from 15 seconds on the first examination to 24 seconds on the last examination; also that by air at first he could not hear the 256 D.V. fork with his right ear but on the next two examinations his ability to hear this fork became very definite. Notice also the marked improvement in his ability to hear conversation from 4¾ feet to 12½ feet. Notice in the case of R. D.. the Rinne was originally negative on the right side and was found to be decidedly positive when last examined. Then there are variations wherein there is a definite improvement followed by a relapse, as in cases C. E., P. W., and K. K. Such variations as depicted above speak eloquently against the idea that the hearing defects in these cases are due to changes in the osseous capsule of the labyrinth. It suggests rather the alternate laying down and the absorption of exudates in the membranous portion of the cochlea. Lesions of this character have not been frequently reported in the literature. Alexander (THE LARYNGOSCOPE, Vol. XXXVIII, No. 5, May, 1928) refers to chronic exudate in the cochlea as in cases of otitis interna vaso-motoria. The lesions in these cases may be similar to that.

Universally Contracted Visual Fields: In Chart IV it will be noticed that all of the cases in which the visual fields are universally contracted have been compiled together for the purpose of comparison with the other items under consideration. Here we find that in two instances is the heredity factor dominant. In all but one, other bodily infirmities are noted. The uric acid content of the blood is

increased above the normal in five of the cases. In the case in which the uric acid figure is normal there is a strong hereditary history. In four of the cases the blood calcium figures are abnormal, and with two it is within the range of normal.

Contraction of the Color Fields Alone: Chart V has recourse to a consideration of the contraction of color fields without contraction of the form fields. This is compiled in relation to the other items, and we find that of the six cases in which this occurs, the factor of heredity is evident in four and absent in two. Concomitant abnormalities were present in all of the cases. The uric acid content of the blood was abnormal in only three of these cases and the calcium content was abnormal in four of the cases. It will be noted that the amount of loss of hearing bears no relation to the amount and character of the contraction of the visual fields.

Abnormal Uric Acid Blood Figures: Chart VI is compiled for the purpose of accumulating all of the cases of deafness in this series which have abnormal uric acid figures in the blood. This takes into consideration eight of the 13 cases under discussion. Here we find that only three cases have a hereditary history of deafness. Seven of the eight cases have other illnesses beside the deafness and all of them have contracted fields, either universally or for color alone. In only one instance in this series is the calcium figure normal. It therefore seems that the disturbance of uric acid and calcium in the blood is more or less related in cases of progressive deafness.

Low Calcium Blood Figures: In Chart VII emphasis is given to the figure of the calcium content of the blood which is lower than normal. In two instances there is a definite hereditary history. In five of the six cases the patient is suffering from some concomitant ailment. In all of the cases the visual fields are contracted universally or for colors alone. The most striking finding in this chart is that in all the cases the uric acid figure is abnormally high.

High Calcium Blood Figures: Chart VIII consists only of three cases. It is compiled only for the purpose of showing the relation between a blood calcium figure higher than normal and the other items under consideration. In two of the cases the hereditary factor is evident. In the three cases constitutional ailments are present. In one case the visual fields were universally contracted. In another the fields were contracted for color only, and in the remaining case no contraction was found. In all of the cases we find the hearing as profoundly involved as with the other items under investigation. The uric acid content of the blood is normal in two of the cases, and slightly above normal in the one case. This is in contrast to Chart VI, wherein all of the cases that showed a low calcium content showed an abnormally high uric acid content.

2 West 87th Street.

CHART I

Name	Sex	M.S.W.	Age	Age of onset	Heredity	Concomitant conditions	Visual fields	Wassermann	Voice	Lower tone	Bone conduction	Rinne	N.P.N.	Blood Chemistry Urea	Uric Acid	Calcium	Chlorides	Sugar	Creatinines
M. D.	M.	M.	35	23	5 of 9 affected	Generalized Itch for 16 years	Colors Contracted	Neg.	R-At ear L-13 in.	Elevated	Shortened	R-Neg. L- Neg.	34	16.8	5.	7.1		148.1	
R. D.	F.	S.	48	46	Father slightly deaf	Gastro-intestinal symptoms with generalized erytheme	Generally Contracted	Neg.	R-18 ft. L-20 ft.	Slightly Elevated	Normal	R-Neg. L- Pos.	27.1	12.5	3.2	12.4	760		
L. C.	F.	S.	26	20	Asthma on maternal side	Alternating diarrhea and constipation	Normal	Neg.	R-1½ ft. L- 1 ft.	Elevated	Normal	R-Neg. L-Neg.			1.2	10.6			
F. G.	M.	S.	25	22½	None	Constipated	Generally Contracted	Neg.	R-8½ ft. L-9½ ft.	Elevated	Shortened	R- Neg. L-Pos.			4.4	6.8			
P. G.	F.	S.	36	20	Father deaf	Frequent bowel movements for 17 years	Color Contraction	Neg.	R- 8 in. L-14 -n.	Elevated	Shortened	R-Neg. L-Neg.			1.8	12.			
K. K.	F.	W.	48	46	None	Arthritis deformans. Itching of skin	Generally Contracted	Neg.	R-8½ ft. L-2 ft.	Elevated	Prolong.R Shorten.R	R-Neg. L-Neg.			5.1	7.5			
G. R.	F.	S.	37	23	Asthma and hay fever in family	Mucous colitis. Bilateral sacro-iliac arthritis	Generally Contracted	Neg.	R-At ear L-10 in.	Elevated	Prolong.R Normal-L	R-Neg. L-Neg.	38.2	17.4	4.6	9.			1.3
M. L.	M.	S.	32	28	Father has asthma	Pain in abdomen with attacks of diarrhea. Diseased tonsils	Colors Contracted	Neg.	R-10 in. L-3½ ft.	Elevated	Prolong.R Prolong.L	R-Neg. L-Neg.	37.5	19.5	5.	7.1	718	68	
C. E.	M.	M.	48	28	One brother deaf	Gastro-intestinal disturbance 20 years. Chronic abscesss in right tonsil	Colors Contracted	Neg.	R-14 in. L- 6 in.	Elevated	Prolong.R Prolong.R	R-Neg. L-Neg.	28.	16.	1.8	8.	600	76	2.

CHART I—Continued

Name	Sex	M.S.W.	Age	Age of onset	Heredity	Concomitant conditions	Visual fields	Wassermann	Voice	Lower tone	Bone conduction	Pinne	N.P.N.	Blood Chemistry Urea	Uric Acid	Calcium	Chlorides	Sugar	Creatinines
S. S.	F.	W.	28	25	Three sisters deaf	G. C. at 21 yrs. Pains in joints. Diseased tonsils	Generally Contracted	Neg.	R-35 ft. L-15 in.	Elevated	Prolong.R Prolong.L	R-Neg. L-Neg.	26.	16.	2.	9.	600		
A. T.	F.	W.	31	22	None	Enlarged thyroid 12 yrs. Diseased tonsils	Green Contracted	Neg.	R-37 ft. L-16 ft.	Elevated	Shorten.R Normal-L	R-Pos. L-Neg.	30.	18.	1.2	9.	600		
F. R.	F.	M.	31	21	1 sister deaf	Psoriasis	Red Contracted	Neg.	R-4 ft. L-6 -in.	Elevated	Shorten.R Prolong.R	R-Neg. L-Neg.			4.9	7.4			
P. W.	F.	S.	28	23	Father has asthma	Vaso-motor rhinitis. Diseased tonsils	Generally Contracted	Neg.	R-12 ft. L-9 ft.	Elevated	Shorten.R Normal-L	R-Pos. L-Neg.	36.4	16.8	4.2	7.	710		

KEY—R.-right. L-left. Blood chemistry figures refer to the number of millegrammes per 100cc of blood. Normal blood chemistry figures are: N.P.N. —25-30 per 100 cc. Urea—12-15 per 100cc. Uric acid—1-3 per 100cc. Calcium—8-10 per 100cc. Chlorides—650 per 100cc. Sugar—60-120 per 100cc. Creatinine—1-2.5 per 100cc.

CHART II

Name	Sex	M.S.W.	Age	Age of onset	Heredity	Concomitant Conditions	Visual fields	Voice	Bone conduction	Rinne	Blood Chemistry Uric Acid	Calcium
M. D.	M.	M.	35	23	Five of nine affected	Generalized Itch—13 to 16 years	Colors Contracted	R-At ear L-13 in.	Shortened	R-Negative L-Negative	5.	7.1
R. D.	F.	S.	48	46	Father slightly deaf	Gastro-Intestinal symptoms with generalized erythema	Generally Contracted	R-18 ft. L-20 ft.	Normal	R-Negative L-Positive	3.2	12.4
P. G.	F.	S.	36	20	Father deaf	Frequent bowel movements for 17 years	Colors Contracted	R- 8 in. L-14 in.	Shortened	R-Negative L-Negative	1.8	12.
C. E.	M.	M.	48	28	One brother deaf	Gastro-Intestinal disturbance 20 years. Chronic abscess in right tonsil	Colors Contracted	R-14 in. L- 6 in.	Prolonged-R Prolonged-L	R-Negative L-Negative	1.8	8.
S. S.	F.	W.	28	25	Three sisters deaf	GC. at 21 years. Pains in joints. Diseased tonsils	Generally Contracted	R-35 ft. L-15 in.	Prolonged-R Prolonged-L	R-Negative L-Negative	2.	9.
F. R.	F.	M.	31	21	One sister deaf	Psoriasis	Colors Contracted	R-4 ft. L-6 in.	Shortened-R Prolonged-L	R-Negative L-Negative	4.9	7.4

CHART III

Name	Date	Side	Voice	Air	Bone	Date	Voice	Air	Bone	Date	Voice	Air	Bone	Gelle
C. E.	Oct. 10, 1928	Right	14 in.	11	23	Nov. 28, 1928	23 in.	12	24	Dec. 6, 1928	15 in.	13	24	Positive
		Left	6 in.	10	21		22 in.	11	22		16 in.	10	22	Positive
M. L.	Oct. 6, 1928	Right	5 in.	..	15	Nov. 9, 1928	15 in.	8	21	Dec. 31, 1928	2 ft.	12	24	Negative
		Left	4¾ ft.	11	20		3 ft.	10	19		12½ ft.	15	24	Negative
P. W.	Oct. 15, 1925	Right	18 ft.	13	17	Oct. 14, 1927	11 ft.	9	17	Jan. 8, 1929	17 ft.	11	21	Positive
		Left	7 ft.	7	18		9 ft.	11	19		5 ft.	10	21	Positive
G. R.	Oct. 14, 1927	Right	At ear	..	18	Dec. 19, 1927	8 in.	..	15	Jan. 3, 1928	19 in.	3	15	
		Left	10 in.	..	15		4 in.	..	13		12 in.	6	16	
K. K.	Nov. 9, 1927	Right	5 ft.	13	15	Jan. 3, 1928	17 ft.	9	12	Nov. 19, 1928	9 ft.	16	18	Positive
		Left	1 ft.	7	15		2 ft.	5	10		13 in.	6	16	Positive
L. C.	Mar. 21, 1928	Right	1½ ft.	11	15	May 21, 1928	2 ft.	11	20					
		Left	1 ft.	10	16		26 in.	8	19					
R. D.	May 31, 1927	Right	18 ft.	13	15	Dec. 5, 1927	21 f t.	14	12	Feb. 24, 1928	40 ft.	16	9	
		Left	20 ft.	15	14		20 ft.	17	13		40 ft.	16	9	
P. G.	Feb. 27, 1928	Right	8 in.	7	13	Apr. 2, 1928	8 in.	8	15	Dec. 16, 1928	5 in.	9	18	Positive
		Left	14 in.	8	11		14 in.	10	12		12 in.	8	16	Positive

Key—Air and bone conduction tested with 256 D. V. fork. Numbers refer to seconds. Normal for air and bone conduction—22 and 15, respectively.

CHART IV

Name	Sex	M.S.W.	Age	Age of onset	Heredity	Concomitant conditions	Visual fields	Voice	Bone conduction	Rinne	Blood Chemistry Uric Acid	Blood Chemistry Calcium
R. D.	F.	S.	48	46	Father slightly deaf	Gastrio-Intestnal symptoms with generalized erythema	Generally Contracted	R-18 ft. L-20 ft.	Normal	R-Negative L-Positive	3.2	12.4
F. G.	M.	S.	25	22½	None	Constipated	Generally Contracted	R-8½ ft. L-9½ ft.	Shortened	R-Negative L-Positive	4.4	6.8
K. K.	F.	W.	48	46	None	Arthritis deformans. Itching of skin	Generally Contracted	R-8½ ft. L-2 ft.	R-Prolonged L-Shortened	R-Negative L-Negative	5.1	7.5
G. R.	F.	S.	37	23	Asthma and hay fever in family	Mucous colitis and abdominal pain—12 years. Has had asthma	Generally Contracted	R-At ear L-10 in.	R-Prolonged L-Normal	R-Negative L-Negative	4.6	9.
P. W.	F.	S.	28	23	Father had asthma	Vaso-Motor rhinitis. Diseased tonsils	Generally Contracted	R-12 ft. L- 9 ft.	R-Shortened L-Normal	R-Positive L-Negative	4.2	7.
S. S.	F.	W.	28	25	Three sisters deaf	GC. at 21 years. Pains in joints. Diseased tonsils	Generally Contracted	R-35 ft. L-15 ft.	R-Prolonged L-Prolonged	R-Negative L-Negative	2.	9.

CHART V

Name	Sex	M.S.W.	Age	Age of onset	Heredity	Concomitant conditions	Visual fields	Voice	Bone conduction	Rinne	Blood Chemistry Uric Acid	Blood Chemistry Calcium
M. D.	M.	M.	35	23	Five of nine affected	Generalized itch—13 to 16 years	Colors Contracted	R-At ear L-13 in.	Shortened-R Shortened-L	Negative Negative	5.	7.1
P. G.	F.	S.	36	20	Father deaf	Frequent bowel movements for 17 years	Colors Contracted	R- 8 in. L-14 in.	Shortened-R Shortened-L	Negative Negative	1.8	12.
M. L.	M.	S.	32	28	Father has asthma	Pains in abdomen with attacks of diarrhea. Diseased tonsils	Colors Contracted	R-10 in. L- 3½ ft.	Prolonged-R Prolonged-L	Negative Negative	5.	7.1
C. E.	M.	M.	48	28	One brother deaf	Gastro-Intestinal disturbance for 20 years	Colors Contracted	R-14 in. L- 6 in.	Prolonged-R Prolonged-L	Negative Negative	1.8	8.
A. T.	F.	W.	31	22	None	Enlarged thyroid—12 yrs. Diseased tonsils	Colors Contracted	R-37 ft. L-16 ft.	Shortened-R Normal-L	Positive Negative	1.2	9.
F. R.	F.	M.	31	21	One sister deaf	Psoriasis	Colors Contracted	R-4 ft. L-6 in.	Shortened-R Prolonged-L	Negative Negative	4.9	7.4

CHART VI

Name	Sex	M.S.W.	Age	Age of onset	Heredity	Concomitant conditions	Visual fields	Voice	Bone conduction	Rinne	Blood Chemistry Urc Acid	Blood Chemistry Calcium
M. D.	M.	M.	35	23	Five of nine affected	Generalized itch for 13 to 16 years	Colors Contracted	R-At ear L-13 in.	Shortened-R Shortened-L	R-Negative L-Negative	5.	7.1
R. D.	F.	S.	48	46	Father slightly deaf	Gastro-Intestinal symptoms with generalized erythema	Generally Contracted	R-18 ft. L-20 ft.	Normal-R Normal-L	R-Negative L-Positive	3.2	12.4
F. G.	M.	S.	25	22½	None	Constipated	Generally Contracted	R-8½ ft. L-9½ ft.	Shortened-R Shortened-L	R-Negative L-Positive	4.4	6.8
K. K.	F.	W.	48	46	None	Arthritis deformans. Itchingof skin	Generally Contracted	R-8½ ft. L-2 ft.	Prolonged-R Shortened-L	R-Negative L-Negative	5.1	7.5
G. R.	F.	S.	37	23	Asthma and Hay fever in family	Mucous colitis and abdominal pains 12 years. Has had asthma	Generally Contracted	R-At ear L-10 in.	Prolonged-R Normal-L	R-Negative L-Negative	4.6	9.
P. W.	F.	S.	28	23	Father had asthma	Vaso-Motor rhinitis. Diseased tonsils	Generally Contracted	R-12 ft. L- 9 ft.	Shortened-R Normal-L	R-Positive L-Negative	4.2	7.
M. L.	M.	S.	32	28	Father has asthma	Pains in abdomen with attacks of diarrhea. Diseased tonsils	Colors Contracted	R-10 in. L-3½ ft.	Prolonged-R Prolonged-L	R-Negative L-Negative	5.	7.1
F. R.	F.	M.	31	21	One sister deaf	Psoriasis	Colors Contracted	R-4 ft. L-6 in.	Shortened-R Prolonged-L	R-Negative L-Negative	4.9	7.4

CHART VII

Name	Sex	M.S.W.	Age	Age of onset	Heredity	Concomitant conditions	Visual fields	Voice	Bone conduction	Rinne	Blood Chemistry Uric Acid	Blood Chemistry Calcium
M. D.	M.	M.	35	23	Five of nine affected	Generalized itch for 13 to 16 years	Colors Contracted	R-At ear L-13 in.	R-Shortened L-Shortened	R-Negative L-Negative	5.	7.1
F. G.	M.	S.	25	22½	None	Constipated	Generally Contracted	R-8½ ft. L-9½ ft.	R-Shortened L-Shortened	R-Negative L-Positive	4.4	6.8
K. K.	F.	W.	48	46	None	Arthritis deformans. Itching of skin	Generally Contracted	R-8½ ft. L-2 ft.	R-Prolonged L-Shortened	R-Negative L-Negative	5.1	7.5
P. W.	F.	S.	28	23	Father had asthma	Vaso-Motor rhinitis. Diseased tonsils	Genarally Contracted	R-12 ft. L- 9 ft.	R-Shortened L-Normal	R-Positive L-Negative	4.2	7.
M. L.	M.	S.	32	28	Father has asthma	Pains in abdomen with attacks of diarrhea. Diseased tonsils	Colors Contracted	R-10 in. L-3½ ft.	R-Prolonged L-Prolonged	R-Negative L-Negative	5.	7.1
F. R.	F.	M.	31	21	One sister deaf	Psoriasis	Colors Contracted	R-4 ft. L-6 in.	R-Shortened L-Prolonged	R-Negative L-Negative	4.9	7.4

CHART VIII

Name	Sex	M.S.W.	Age	Age of onset	Heredity	Concomitant conditions	Visual fields	Voice	Bone conduction	Rinne	Blood Chemistry Uric Acid	Blood Chemistry Calcium
R. D.	F.	S.	48	46	Father slightly deaf	Gastro-Intestinal symptoms with generalized erythema	Generally Contracted	R-18 ft. L-20 ft.	R-Normal L-Normal	R-Negative L-Positive	3.2	12.4
L. C.	F.	S.	26	20	Asthma on maternal side	Alternating diarrhea and constipation	Normal	R-24½ in. L-26 in.	R-Prolonged L-Prolonged	R-Negative L-Negative	1.2	10.6
P. G.	F.	S.	36	20	Father deaf	Frequent bowel movements for 17 years	Colors Contracted	R- 8 in. L-14 in.	R-Shortened L-Shortened	R-Negative L-Negative	1.8	12.

CONDUCTIVE DEAFNESS DUE TO LYMPHATIC LEUKEMIA.

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In discussing deafness occurring in cases of leukemia, the text-books lay particular stress upon leukemic involvement of the labyrinth or eighth nerve, and barely mention, or even omit referring to middle ear deafness in this condition. In the following case the diagnosis of leukemic middle ear deafness seems sufficiently clear to justify a brief description of the clinical findings.

Mr. W. W. consulted Drs. Epplen and Anderson on April 10, 1926, complaining of a marked malaise. The cervical and posterior axillary glands were found enlarged and the leukocyte count was as follows: W.B.C. 47,800, polymorphonuclears 13, small lymphocytes 41, large lymphocytes 1, transitionals 1, eosinophiles 1, basket cells 43.

A diagnosis of lymphatic leukemia was made and treatment instituted.

The patient was first seen by us during this illness on July 7, 1926, complaining of deafness in both ears, which had been present one month in the left and for a shorter time in the right. He had at this time, in addition to the enlaged lymph nodes referred to above, several leukemic nodules in the arms and legs.

Inspection of the ears was negative, and the Eustachian tubes were entirely normal on inflation. Functional ear examination with the Hartman forks was as follows: (In the following the numerator indicates the length of time the fork was heard in seconds, and the denominator the length of time it should be heard by the normal ear):

A. D.		A. S.
Contact	Watch	Contact
25,000+	High Tone Limit	25,000+
64—	Low Tone Limit	64—
35/60	C Fork	35/60
27/40	C_2 Fork (Air)	25/40
35/15	C_2 Fork (Bone)	35/15
15/20	C_4 Fork	15/20

Weber indefinite.

In the foregoing the marked increase in bone conduction and the greater impairment for low tones make the diagnosis of conductive

deafness certain. The absence of any involvement in the Eustachian tubes and the short history, compared with the severity of the loss of function, in an individual with lymphatic leukemia, led to the presumptive diagnosis of leukemic involvement of the middle ear, probably by cellular infiltration similar to the nodules which had appeared in other parts of the body. At this time a course of X-ray treatment was instituted, and he was next seen on Aug. 13, 1926, or about five weeks after the above functional test. During this time the nodules and enlarged glands had entirely disappeared, and the pateint stated his hearing had improved remarkably. The leukocytes had dropped to 23,500. Inspection of the ears was still negative, and the Eustachian tubes were still normal. A partial functional test at this time showed:

A. D.		A. S.
16 sec.	Watch	16 sec.
30/40	C_2 Fork (Air)	30/40
17/15	C_2 Fork (Bone)	19/15

The improvement in hearing for the watch and the C_2 fork and the definite reduction in the bone conduction would indicate a very definite improvement in the conductive deafness. This having been coincident with the disappearance of the leukemic nodules throughout his body, it was assumed, and I believe with good reason, that a similar subsidence of leukemic infiltration in the middle ear had occurred.

The patient has since died, but no autopsy was performed.

404 Paulsen Building.

THE REPORT OF A CASE OF CHRONIC SUPPURATIVE OTITIS MEDIA WITH LABYRINTHINE SYMPTOMS AND THE REPORT OF AN OPERATION FOR THE REMOVAL OF EXOSTOSES OF THE EXTERNAL AUDITORY CANAL, WITH SOME REMARKS ON THE MODIFIED RADICAL MASTOID OPERATION.*

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A boy, age 9 years, with a chronic suppurative otitis media of four years' duration was brought into the clinic during an attack of acute labyrinthitis. He had violent vertigo, vomiting and nystagmus. Though directions for his immediate admission to the hospital were given, he was not admitted until the following day, when he was still very dizzy and unable to stand. He had marked nystagmus to his left or sound side and a tendency to fall to the right or diseased ear, but the vomiting had ceased. His temperature was normal and his leukocyte count 9,600. Except that the sound from a tuning fork when placed on head was referred to the affected ear, there was no sign of function left in either the static or auditory portions of the labyrinth of his right ear. Richards (John D.) reported a case some time ago in which this occurred after the labyrinth had been removed, so it was not regarded at the time as significant of any possible return of function. After eight days of rest in bed, the vertigo and the nystagmus had practically disappeared. The caloric test was still negative, and there was total loss of hearing in the ear. There was no reaction to either hot or cold irrigation, kept up for over five minutes, and the absolute deafness was demonstrated by the use of two noise apparatuses.

A foul middle ear discharge persisted through an old perforation in the lower part of the membrane, and polypoid material could be seen in the middle ear. The fistula test was negative. The rectal temperature was never above 100° F. during his stay in the hospital, and the leukocyte count remained normal. After nine days in the hospital he was discharged to return later for operation on his mastoid. The acute labyrinthine disturbance had then subsided, leaving an ear that reacted to neither sound nor caloric tests but with evidence of severe involvement in the middle ear and mastoid, for which operation was plainly indicated as soon as it could be safely

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performed. When proper time had been allowed for the communications between the labyrinth and the meninges to become walled off it was our intention to perform a radical mastoid operation and at the same time to open the labyrinth to allow an exit for any inflammatory disturbance that might be caused by the operation. After eight weeks, the patient was re-admitted for this operation, and it was then found on re-examination that hearing had returned in the diseased ear and that a positive caloric reaction was present. The thought of opening the labyrinth was abandoned, and a radical mastoid alone was performed. At this operation the antrum and attic were found filled with cholesteatoma. When this was removed, a dark spot was discovered on the wall of the horizontal semicircular canal, which was not interfered with. The stapes could be seen in the oval window, and on its being touched lightly with a cotton applicator it fell from its niche without any escape of labyrinthine fluid. The footplate had been separated from its attachment by the cholesteatoma, and a white membrane lay across the oval window.

Recovery of the case was uneventful. An examination five months after the operation revealed a dry, well dermatized cavity with the oval window niche in plain view. Hearing for acoumeter was three feet, and whisper 15 feet. On rotation to the right and left there was a difference of only four seconds in the after-nystagmus. The caloric test was promptly active. Had this patient been operated on three weeks instead of eight weeks after his attack of labyrinthitis the function would not then have been present, and his labyrinth would have been opened and destroyed by the operation.

This case shows how impossible it is to distinguish between the diffuse serous and the diffuse suppurative type of labyrinthitis. Certainly, no distinction can be made between the two during an attack, and no prognosis on the return of function can be made. When a partial or, as in this case, a complete return of function takes place we assume that the involvement was of the serous type.

THE REPORT OF AN OPERATION FOR THE REMOVAL OF EXOSTOSES OF THE EXTERNAL AUDITORY CANAL, WITH SOME REMARKS ON THE MODIFIED RADICAL MASTOID OPERATION.

In the Ear, Nose and Throat Volume of Practical Medicine, Series 1928, under Aural Exostosis, attention is called to a case reported by Dr. J. C. Scal illustrating the bad results following operation for this condition. The operation referred to was that of chiseling away the exostosis through a post-auricular incision.

From my experience with a similar case, I feel that Dr. Scal sounds a timely warning against this operation, notwithstanding the editor's statement in this year book that, "The plan of chiseling

away the exostosis and part of the wall of the external auditory canal is still considered the proper treatment for this condition". Experience has convinced me that some of us may be misled by this statement and that one has but to attempt this operation to discover the difficulties of its after-treatment and the almost inevitable disappointment that results. I do not refer to the pedunculated variety of exostoses that are reported to be easily pried out like a tooth or removed with a notched piano wire, etc. I have had no experience with them.

After watching for a year or more the gradual bony occlusion of the external auditory canal in a young man who had developed exostoses in the canals of both ears, I was forced to operate on one because of the inflammation and increasing discomfort that was caused by the accumulation of epithelial debris and moisture in the canal. This was due to two exostoses in this ear that lay in contact except for a space above them that would barely admit an attic probe. The difficulties encountered and the final solution of the problem will, I hope, justify a rather detailed description.

The larger growth sprung from a broad base on the postero-inferior wall and lay in contact with a smaller growth on the anterior wall. A curved post-auricular incision was made over the mastoid, the auricle was reflected forward and the membranous canal carefully separated from the posterior wall. In spite of great care, the thin lining of the canal could not be separated satisfactorily from the crest of the prominence. In cases in which operation is indicated I doubt that this would be an unusual difficulty owing to the friable condition of the membrane from the maceration and inflammation that is apt to be present. The inner side of the exostosis was so close to the drum membrane that it had become adherent to it, and the result on its removal was a tear in the posterior part of the drum membrane. The anterior prominence was not disturbed, as any traumatism to the wall opposite would have been likely to result in deep adhesions between the two walls and cicatricial atresia. The removal of the posterior prominence was satisfactorily accomplished, except for the injury to the drum membrane, and the canal was widened at the expense of the posterior wall as far as it was possible to do so without invading the subcortical cells of the mastoid. The remnants of the canal lining were replaced against the excavated posterior wall and held in place by a half-cylinder of thin, soft silver, against which packing could be placed and removed daily without causing great pain and without interfering greatly with dermatization. Space enough was gained to permit a view of the posterior

half of the drum membrane and the large perforation that had resulted from the operation. The post-auricular incision healed promptly, and at the end of three weeks the perforation in the drum membrane had contracted to the size of a pin. The canal had dermatized except for a small area of bare bone on the floor, from which granulations persistently grew in spite of the curette and the use of silver nitrate. The canal, which was then a fairly satisfactory size, showed a tendency to contract in spite of every effort to keep it open, and a disappointing result could be plainly foreseen.

The patient then developed signs of severe middle ear and mastoid infection which made operation on the mastoid necessary. This unforeseen involvement of the mastoid proved a blessing in disguise, more appreciated at the time by the surgeon than by the patient. As exenteration of the mastoid was then warranted, opportunity was afforded for lowering the posterior canal wall to the annulus and the construction of a new meatus of ample size. By this operation, a gratifying result was obtained when the reverse seemed to be inevitable. Excellent hearing was regained in the ear and a meatus through which the drum membrane can still be seen without a speculum.

The operation performed was a modified radical mastoid, as it sometimes is performed, without the removal of what Blackwell calls the epitympanic ring. In limiting the operation for the removal of these growths to the canal the posterior wall cannot be chiseled back sufficiently without exposing and traumatizing the adjacent cells in the mastoid. Infection of these cells is almost sure to take place during the prolonged after-treatment. Extension to other cells in the mastoid takes place and healing is delayed just as it often is where an incomplete mastoid operation has been performed.

My conclusion is that when exostoses of the external auditory canal have so occluded the canal that operation for their removal is indicated, the modified radical operation with complete exenteration of the mastoid offers the most satisfactory solution of the problem. This operation is also particularly applicable to cases of recurrent mastoiditis in which partial atresia of the canal has followed a previous operation. It is the custom of our clinic not to overlook these troublesome atresias but to correct them by lowering the posterior canal wall to the annulus and constructing a new meatus. The prompt closure of the posterior wound at the time of operation is an advantage and treatment of the cavity through the new meatus very satisfactory.

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LATENT MASTOIDITIS WITH NECROTIC BONE.*

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The case about to be reported is an odd one, so far as the writer's experience goes, since he has never seen another just like it; nor has he been able to find one in the literature. To him, the case was so strange and contradictory that he deferred operating it for a long time.

It is because of the absence of so many characteristic symptoms and signs of mastoiditis, together with the unmistakable X-ray findings of mastoiditis with necrotic bone, subsequently confirmed at the operation, that the writer is prompted to report the case.

The case, Mrs. J. C. R., age 34 years, medium height, apparently in good health but 30 pounds overweight, was referred by Dr. R. S. Magee, of Audubon, N. J., Oct. 19, 1928.

History: The patient claims that as a child she had trouble with her ears, "lots of earache". She remembers her mother taking her to Prof. —— in Baltimore for treatment. She recalls having pain in the left side of her head and neck. When she was about two years of age she had abscess opened on the left side of her neck—the scar of which is still evident. Jan. 15, four years ago, she suffered with pain in the forehead and face. Her doctor, at that time, pronounced it an infected sinus, for which she was advised to use argyrol solution in the nose every three hours. In about two weeks the condition cleared up. Two weeks later she awoke one morning with "terrific earache" on the left side. Twelve hours later the membrane ruptured. This was followed by a profuse discharge, which gave her relief. Four months later (May of the same year) "a bubble in the left ear seemed to break," with the discharge of a lot of secretion; however, there was no pain. Dr. Magee treated the ear by irrigation. A few months later the patient had an attack of neuritis, here and there all over her body. The discharge from the ear stopped and has never returned. She has used all kinds of treatment, including liniments and thermolight. She complains of a feeling as though there was a bubbling of water in the left ear. At the present time she complains mostly of pain in the head, more pronounced on the left side, especially around and about the ear, and occasional dizzy attacks. Three years ago she was told by an ear specialist in New Jersey that she had an "infected mastoid bone".

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Examination of the Hearing Function, Nov. 1, 1928:

Right Ear		Left Ear
	Weber	Normal duration
Shortened 5″(?)	Schwabach	Normal
+40″	Rinne	+40″
Normal	C_1	Normal
Normal	c_4	Normal
Shortened 5″(?)	Air	Shortened 5″(?)

Audiometer tests of both ears by air and bone conduction showed no marked changes, other than a slight bilateral uniform loss of hearing.

Otoscopic Examination: Right ear: The memberane is intact, brilliant, quite opaque anteriorly. There is a sharply defined atrophic area in the posterior half; no retraction; with the Siegel instrument there is revealed a slightly excessive mobility in the atrophic area, with overlapping of the stria malleolaris. By Politzer inflation the membrane comes out over a large area and goes back promptly in spite of the atrophic area.

Left ear: The membrane is intact, brilliant, quite opaque, except for an oval atrophic area below and behind the umbo. There are chalk deposits in the posterior part of the membrane near the peripehry at 2:30 o'clock. With the Siegel instrument the membrane moves in the atrophic area slightly in excess of the hammer handle. By Politzer inflation the membrane comes out over a large area and returns promptly.

Examination for Spontaneous Nystagmus: When looking to the extreme right, there is a mixed rotary horizontal nystagmus to the right.

When looking to the extreme left, there is a mixed rotary horizontal nystagmus to the left.

The nystagmus to one side is no more pronounced than to the other. There is no nystagmus when looking straight ahead.

During the examination for nystagmus, the patient's eyes become red and water when she flinches, claiming that the light irritates the eye "terribly", and for this reason further labyrinthine tests became impossible in spite of our efforts at moral suasion.

Dec. 3, 1928: Re-examination of the hearing revealed normal function throughout.

Nose Examination: There is a deviation of the septum to the left side. The middle turbinate on the right side has been removed in large part. The middle turbinate on the left side is not visible before shrinking. It is possible to enter an applicator into the right frontal sinus. The bulla ethmoidalis on the right side is fairly pronounced

but not pathologically so. There is no gross evidence of sinus disease on either side detectable by rhinoscopic examination at this time.

Mouth and Throat Examination: The tonsillar fossae are clean, due to a successful tonsillectomy performed 20 years ago. The upper and lower third molars are missing on both sides. The upper left first and second bicuspids are also missing. Otherwise the upper and lower dentures appear to be normal.

The first X-ray findings made by someone other than Dr. Post read as follows:

Oct. 30, 1928: "Roentgen study made of both the right and left mastoid regions reveals the following conditions: The right mastoid shows evidence of a chronic sclerotic mastoiditis, with practically complete destruction of the mastoid cells as to their identity. The

Right Left

The irregular area surrounded by arrows in front of the knee of the sinus on the left side shows the pathology described in the text. The larger arrow pointing from above shows the area of a break in continuity of the tegmen tympani.

lateral sinus marking is forward and quite irregular in its contour.

"The left mastoid also shows a chronic sclerotic mastoiditis, with suggestion of a few small mastoid cells at the superior portion. The lateral sinus is forward, quite irregular in contour. I am unable to determine any present active necrosis."

Because of the total absence of clinical signs of mastoiditis, the writer requested Dr. Joseph W. Post to check up on the findings of the previous Roentgenologist. Dr. Post's findings read as follows:

Nov. 2, 1928: "Roentgenologic study of both mastoids of Mrs. R. reveals evidence of the following: Right mastoid shows evidence of a moderate-sized process. There is a complete absence of cellular structure between the anterior wall and the sinus groove and the posterior wall of the canal. The structures between the anterior wall

of the groove and the posterior wall of the canal show evidence of a homogenous increase in density, with the exception of the region of the antrum, which appears as a circumscribed area of rarefaction. From the appearance of this entire process, I believe that it represents an infantile diploetic mastoid process and without a history of ear symptoms, I would not express an opinion upon the appearance of the antrum.

"Left mastoid shows evidence of moderate-sized process, corresponding in general structure to its mate on the right side, with the exception that there is more of a tendency of cellular trabeculations between the anterior wall of the sinus groove and the posterior wall of the canal. The appearance of these structures in the region of the knee of the sinus gives me the impression of active mastoid disease, which is extending upward in the direction of the tegmen tympani, and I am very suspicious that there is already a break in its wall."

Because of the concurrence of the two Roentgenologists in their gross interpretations of the left mastoid, and especially because of the persistence in the headache referable to the left mastoid region, the writer felt impelled to operate the case.

Opration: Patient was operated Dec. 4, 1928, under gas-oxygen anesthesia. A typical retroauricular incision, 4 c.m. long, was made behind the left auricle through the skin and soft tissues down to the bone. The periosteum and soft tissues covering the mastoid were elevated to the posterior wall of the canal, the mastoid tip and the temporal ridge. The mastoid was opened with a No. 12 Alexander chisel. The cortex was quite hard; no cells were found until the antrum was reached. The antrum was large and the surrounding bone denuded of mucoperiostum, which was recognized by the characteristic feel of raw bone with the probe. It was somewhat softer than normal bone; at the same time more fragile. When plying the chisel to the bone elsewhere about the mastoid there was a tendency for it to fracture readily. No free pus was apparent anywhere. The antrum was very large and surrounded by a layer of necrotic bone, and this again by a zone of eburnated bone. Upon entering the antrum the tegmen was found missing over an area equal to about seven-tenths of a square c.m., having been destroyed by the necrotic process. Furthermore, the dura seemed to be slightly congested; however, there were no granulations present nor was there any free pus on the surface of the dura. The sinus was found to be fairly close to the posterior wall of the canal (the nearest approach of the sinus to the canal was about 5 m.m. posteriorly and low down).

From the history of the case and the X-ray findings, together with the operative findings, I am inclined to believe that the most

logical explanation of the pathological condition in this mastoid is that there was present at some time in the past, perhaps four years ago, a well defined active mastoiditis, but owing to the thick, resistent cortex there were no external manifestations at that time nor since. In the meantime, the active manifestations of suppuration, so far as aural discharge is concerned, improved, leaving unhealed and necrotic changes in and about the mastoid antrum, reaching as far as the dura of the middle fossa. It was this exposure, no doubt, that caused the patient's headache, for following the operation, the headache promptly disappeared and has not returned since.

SUMMARY.

As to the *absence of many of the characteristic symptoms and signs of mastoiditis,* the appearance of the drum membrane was much the same on both sides, there was an absence of redness, bulging or perforation. There was no sagging of the superior-posterior wall of the osseous canal; no evidence of increased thickness of the periosteum over the mastoid; no mastoid tenderness; no hearing defect, and no rise of temperature. Study of the labyrinthine function was impossible because of hyperirritability of the eyes, imaginary or real. There were several other indications of hysteria, including exaggerations, all of which had to be weighed carefully before the writer could elect to operate the pateint. From the otologist's viewpoint everything seemed to be negative, except for the history of discharge four years before, which had since cleared up completely, and the complaint about headache and pain around and about the left ear, which one would be inclined to discount because of the tendency of the patient to magnify her symptoms.

As for the X-ray findings and the accuracy of their interpretation, the writer feels indebted to Dr. Post. They were confirmed in detail at the operation.

That the headache and pain around and about the left ear was due to the presence of necrotic bone surrounding the antrum, together with the exposure and congestion of the dura of the middle fossa, there can be little doubt; for, immediately following the operation these particular symptoms disappeared.

The bacteriologic findings from the depth of the wound cavity revealed staphylococcus in pure culture.

Because of the overweight of the patient and the presence of necrotic bone in the mastoid a blood sugar test was made, revealing 105 m.g. of sugar to 100 c.c. of blood.

The Wassermann was negative. No tuberculin test was made in spite of the history of an abscess in the neck and a scar about the middle of the anterior border of the sterno-cleido-mastoid muscle on the left side.

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THE MODIFIED RADICAL MASTOID OPERATION FOR THE CURE OF CHRONIC OTORRHEA.*

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In cases of chronic otorrhea the author feels that every operation or method of treatment has its own value, which may be enhanced by the skill and judgment of the attending otologist; these attributes are acquired only by extended clinical experience. For the past 17 years he has performed this operation several hundred times.

Unlike the usual radical mastoid operation, this procedure is not primarily intended as one which would produce a dry tympanic cavity, but to obtain first a useful ear and then, if possible, a dry one. It will be noted in the description of this operation that the middle ear structures—membrana tympani, ossicles and lining mucous membrane—are allowed to remain practically undisturbed; this being true, it follows that in some cases where there is a large perforation in the drum which remains unhealed, there may subsequently be some mucus discharge. This exudate is the natural secretion from the mucous membrane which is allowed to remain lining the tympanic cavity. It will be seen that the bottom of the wound, *i. e.*, the tympanic cavity, does not heal by epidermatization, as is the case after a radical mastoid operation is performed, but by restoration of normal mucous membrane, while throughout the rest of the cavity epidermatization takes place as in the older operation. Any post-operative discharge which may occur after the wound has healed is usually intermittent, nonodorous, mucus in type and unnoticed by the patient. As long as the antral region is permanently aerated, healed and dry this discharge if present has no surgical significance.

The faulty practice of defining as otitis media purulenta chronica cases of chronic otorrhea which have persisted in spite of treatment and upon whom operation is indicated is quite apparent. The condition should be termed a chronic mastoiditis, and deserves to be considered as such and not, as the name implies, merely a chronic purulent discharge in the middle ear. The site of the trouble and source of the discharge lies not in the middle ear, but in the mastoid process itself. As we well know, there forms in these cases a cavity of varying size in the region of the antrum, which becomes filled

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with granulations, cholesteatoma, pus, detritis, dead bone, etc. During the course of the disease the overlying bone and surrounding walls of this cavity become rarefied and condensed, the accumulated products of inflammation forming a nidus of infection, which constantly reinfects the middle ear, causing a continuance of the discharge.

Pus in this mastoid antral cavity may form under pressure and be so gradually applied as to give little evidence of an erosion which may suddenly take place through the bone to the contiguous dura of the middle fossa above, knee of the sinus behind and externally, or to the lumen of the cap of the semi-circular canal below.

When intracranial complications develop during the course of chronic otorrhea it is in these specified localities that the earliest evidences of the infection are most often found, caused no doubt by their proximate relation to this cesspool of infection usually found in the antral region in chronic mastoiditis. Owing to the mal-development commonly found in the mastoid process of patients afflicted with chronic otorrhea the relation of these important structures, *i. e.*, the antrum, the knee of the sigmoid sinus and the dura of the middle fossa, is likely to be much closer and more intimate than is the case in a normally developed bone. It is evident, therefore, that the only way to surgically insure a patient suffering from chronic mastoiditis from serious intracranial complications is to thoroughly aerate, drain and expose the antral region, as otherwise this infected focus will remain or reassert itself. Nature sometimes has a way of automatically curing chronic mastoiditis by causing a necrosis of the superior bony canal wall down to and including the epitympanic ring, which, when sufficient bone sloughs away, permits permanent drainage from the interior of the mastoid and often approximates the result obtained by the operation about to be described, *i. e.*, perforation of the superior wall near the attic. It might be said with a certain amount of truth that this operation is but an extending of the effort which nature at times makes to cure chronic otorrhea.

We find the middle ear will return to normal in so far as possible when once this antral region has been permanently aerated, drained and healed. Good-sized perforations of the drum, both central and marginal, will frequently undergo repair. There seems to be a primitive effort on the part of the tympanic membrane to reconstruct itself when once the cause of this destruction, *i. e.*, the antral abscess has been healed.

Operative Indications: This operation seems to be especially indicated in cases of chronic otorrhea with a history ranging from sev-

eral months to several years. Usually with a discharge of eight to 10 years or more, such extensive necrotic changes have taken place in the middle ear with a resultant loss of hearing as to render the modified radical operation useless from the standpoint of securing a good functional result; this, however, is not always the case. This operation is indicated in any case of chronic mastoiditis with good hearing in which the ear continues to discharge despite conscientious and persistent treatment for it is reasonable to suppose that a continuation of the discharge will cause a diminution of hearing in the affected ear. It is also indicated in cases similar to the above where the hearing is not so good, but with the drum more or less intact. Cases of recurrent mastoiditis where the posterior auditory canal has collapsed, producing the effect of a slit-like opening, seem to lend themselves to the procedure.

It should be the operation of choice in cases of exostosis of the canal associated with chronic otorrhea and in perforation of the premastoid lamina with necrosis of the posterior bony canal wall. This operation is especially indicated in children and young adults with a chronic ottorrhea in whom treatment has proved unavailing. Results in the latter class have been particularly gratifying.

Anatomic Considerations: At this point it may be well to review the surgical anatomy of the epitympanic region. The attic of the tympanum is that portion of the middle ear cavity which lies above the level of the tympanic membrane. It contains the head of the malleus and the greater part of the incus. These two ossicles articulate in about the middle of the attic. Running upward from the head of the malleus to the vault of the attic is the superior ligament of the malleus. The malleo-incudal body, with the superior and anterior ligaments of the malleus, divide the epitympanum, surgically, into two cavities; the internal attic, lying internally to these structures, and the external attic, lying externally. The external attic is still further subdivided by the external lateral ligament of the malleus into Prussak's space, which lies below, and a much larger space above, the external attic proper. In cases of chronic mastoiditis the natural avenue of escape for pus and inflammatory products from the antral region and mastoid is by way of the external attic to the tympanic cavity proper, through the drum, to the external auditory canal. It will be noted that the inner extremity of the superior bony canal wall, to whose inner margin is attached Shrapnell's membrane and membrana tympani, also constitutes the external attic wall and acts as a distinct barrier to the direct escape of inflammatory products from the mastoid, antrum and attic. Until necrosis occurs in this

superior wall, producing in effect an attic perforation or artificial removal of the wall by operation, takes place, pus from the mastoid must necessarily pass through the attic and middle ear before reaching the auditory canal.

The essential distinguishing feature of this operation is the complete removal of this wedge-shaped mass of bone constituting the external attic wall (Figs. 91-92). It is removed in its entirety posteriorally from the fossa incudus to a point in front, where it joins the anterior bony canal wall. Roughly speaking, this could be represented diagramatically by using the face of a clock as an illustration and removing that portion of the dial represented by the space lying between the figures of 11 and 3.

Operation: The usual post-aural incision is made with the exceptions that its upper extremity is curved until directed horizontally forward, terminating at a point about an eighth of an inch above and in front of the superior attachment of the auricle. The soft parts anterior to this incision are elevated and retracted forward. The mastoid cortex is removed with a gouge and the subcortical cells, if any, are present with curettes until the antral space is opened. The bone in the zygomatic region is removed, the posterior bony canal wall lowered and the antrum curetted and widened to its fullest possible extent, until the cap of the external semi-circular canal becomes plainly visible. Next, the external attic wall is removed by passing a small, narrow Spratt curette from the antrum behind directly forward until the cutting edge of the spoon rests immediately on the internal aspect of the bony external attic wall. The long axis of the curette should be passed parallel to the same plane as the external semi-circular canal and held slightly above it (Fig. 2). By observing these precautions we insure the entrance of the instrument into the external and not the internal attic, which mistake would probably result in the unintentional removal of the incus. With the spoon in the external attic in the position as described, the short process of the incus lies directly below and external to it and by keeping the edge of the curette in close apposition to the internal aspect of the bony external attic wall there is no danger of disturbing the malleo-incudal body lying in front and internal to the back of the end of the curette.

The external wall of the attic is then removed by curetting directly outward, the direction of motion being still in the same plane as the external semi-circular canal. The posterior superior bony canal wall is lowered to within about an eighth of an inch of the membrana tympani and reduced in thickness until the facial ridge is reached,

leaving only the epitympanic ring arching above the top of the drum from the posterior to the anterior canal wall. The short process of the incus should now be visible; it is commonly found embedded in a mass of granulation tissue, but is always located just below and anterior to the cap of the external semi-circular canal, resting in a slight hollow, termed the fossa incudus, to which it is attached by a ligamentous band, the posterior ligament (Fig. 3). Care should be taken not to rupture it as the incus would probably become dislocated subsequently.

We now continue to remove the external attic wall by curetting in the aforesaid manner until the body of the incus and the head of the malleus is exposed (Fig. 4). During the latter stage of this portion of the operation the curette has been in contact with the anterior wall of the attic. The epitympanic ring is now removed and granulations, polypi and cholesteatoma lying in the internal and external attic are removed by curetting on either side of the malleo-incudal body, care being observed not to destroy the suspensory ligament of the malleus. The drum and ossicles are of course not removed, but left in position and disturbed as little as possible during the course of the operation. The middle ear is gently syringed. Having concluded the bone work, an L-shaped meatal flap is cut, as in a radical operation, the cartilage removed and the flap sutured to the temporal fascia. Light iodoform gauze packing is placed in the antral region and the posterior wound is sutured throughout. No packing is placed in the tympanic region, as in a radical mastoid, for fear of dislocating the middle ear structures lying at the bottom of the wound.

Post-operative Care and Dressing: These patients, differentiated from those upon whom the usual radical mastoid operation has been performed, must have their wound completely dressed every day following the operation, otherwise infection might develop in the soft parts. While placing the packing in the antral region and cleansing the wound we must remember that the remains of the drum and ossicles lie at the bottom of the cavity and can easily be dislocated and care should be taken not to do so. The bandage is worn until the posterior wound heals, when it is removed; then usually all packing is left out of the wound and dry treatment instituted, as in a case of chronic otorrhea. Should some infection take place and the discharge become profuse, gentle boric acid irrigations may be instituted; no cotton should be worn in the canal. The patient is instructed as to the correct manner of cleansing the cavity through

the external auditory canal opening, generally by instilling a few drops of a solution of peroxid of hydrogen, then the cavity should be carefully dried. This procedure should be carried out several times daily. The antral space should not be permitted to fill up with granulations and should be kept free until epidermatization takes place.

Summary: I feel that this operation is conservative as compared with the usual radical mastoid operation because of its beneficial effects upon the patient's hearing.

Facial palsy, which sometimes follows the usual radical mastoid operation, I consider is more frequently produced by the necessary intratympanic instrumentation than is commonly supposed. You will note that the danger of producing a similar complication in the same manner while performing this modified radical mastoid operation is practically *nil* as the middle ear structures are undisturbed.

The complete removal of the bridge of bone forming the external auditory canal and constituting at the same time the inner extremity of the superior bony external attic wall to which Shrapnell's membrane and a part of the drum on either side is attached, is a most important factor in securing subsequent drainage from the epitympanum. Its removal apparently does not materially weaken the support for the drum.

We consider that one of the greatest fields for this operation is in children and young adults afflicted with a chronic otorrhea. In these young patients the physician usually hesitates to recommend the usual radical mastoid operation with its attendant loss of hearing, and so after the removal of the tonsils and adenoids applies local treatment for a more or less indefinite period, that is, as long as the ear continues to discharge, hoping that the recuperative powers of youth will eventually bring about a dry ear, and while this sometimes occurs, it may be accompanied by a serious loss of hearing in the affected ear. The hearing of these young patients can be conserved by performing a modified radical mastoid operation early in the course of the affliction.

In closing, it might be noted that should it become necessary to do so, almost any modified radical cavity can be converted into what might be termed a radical cavity by cocainizing the tympanic region and removing the middle ear structures with a curette.

2 East 54th Street.

PITUITARY TUMOR.*

DR. ALEXANDER LASZLO, New York.

Mrs. O. C., age 47 years, a housewife, was seen by me for the first time on Aug. 2, 1926. She had been treated for seven weeks in the eye department of another hospital for her double vision. Diagnosis was: Third nerve paralysis, probably from focal infection.

The history of the patient revealed a double vision of about seven weeks' standing. It had appeared suddenly, accompanied by slight headaches, difficulty in breathing through the nose, clogging of both nostrils, mostly on the left; pussy discharge from the left side, and a nasal twang.

Previous history and family history are not important. The patient denies lues or any other infectious or venereal disease. Married 20 years, never had any children, no miscarriages. General health O. K., except some headaches, which she attributed to her double vision. Appetite and bowels O. K. No polyuria or polydypsia. Had lately lost seven or eight pounds in weight.

Examination of the nose shows a marked deviation of the septum to the left side; both middle turbinates enlarged, on left more than on right; pussy discharge from both nostrils, more from the left; tonsils small, imbedded. After shrinking down the nose with cocain adrenalin, a definite blocking against the posterior meatus is noticeable.

Rhinoscopia posterior shows a tumor, peanut-size, with smooth and round vascular surface extending and blocking almost the whole posterior pharyngeal space. The consistence of the tumor is hard and it is not movable.

X-ray examination shows clouding in the maxillary antrum and ethmoidal region on the left side, suggesting moderate membranous thickening. The nasal septum shows an S-shaped deviation to the right in its upper half and somewhat to the left below. The nasal aeration is also diminished.

Examination of the skull shows the floor of the sella turcica broken and depressed, with absorption at the root of the posterior clinoid processes, suggesting hypophyseal disease.

X-ray examination of the teeth shows a pronounced recession of the alveolar process due to pyorrhea. The upper left canine shows

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imperfect, rude canal filling. The same condition is noted in the upper left central incisor and lower left molar.

Eye examination shows paralysis of the third nerve complete on the right. Vision: Right, +1.25.20/20; left, —3.5 cyl. ax. 165 20/30. No central or hemianopic scotoma. Field for white, normal; for color, slightly narrowed. Slight anisokoria, right pupil larger and sluggishly reacts to light and convergence. Fundi normal on both sides.

General examination shows the patient's heart, lungs and kidneys are normal. Urine normal, no sugar or albumin. No metabolic disturbances. No change of the bony structure (no symptoms of acromegalia). Wassermann test negative.

A diagnosis of post-nasal tumor originating from the pituitary gland was made and, because the patient declined any surgical interference, deep X-ray therapy was given. This time no biopsy was done. Between Aug. 18 and the beginning of October she had nine deep radiations. On Oct. 6, her condition was much improved. The diplopia disappeared; she had no more headaches; the tumor in the posterior pharyngeal space was somewhat smaller but still blocked the nose.

Six weeks later the patient's condition was still further improved. She had very little difficulty in breathing through the nose, no discharge, no diplopia, no headaches.

Between Dec. 15 and March 2 she received six more radiations.

April 20, 1927, the patient had absolutely no complaint. Her breathing was perfectly free; her eyes did not bother her. The tumor was very much smaller but still could be recognized in the posterior pharyngeal space. The patient had gained about 10 pounds.

The patient did not return until Sept. 30, 1927, when her condition was almost as bad as when I saw her the first time. She complained of pain around the left eyeball, and difficulty in breathing, and after shrinking down the nasal cavity a reddish tumor could be recognized pushing forward between the turbinates and the septum.

At the advice of her family physician, she went to Boston to consult Dr. Cushing, who pronounced the tumor inoperable and advised further deep X-ray therapy. Until February she received 10 more radiations. After this her condition improved again, although the tumor could be seen in the nostril without even shrinking the cavity. Her condition remained stationary for a few months, but toward the end of the summer became worse again.

She was seen by me at the beginning of September, when she showed exophthalmus of both eyes; total obstruction of both nostrils. The tumor could be seen in the left nostril without even using the nasal speculum.

After consultation with Dr. Meyers, who thought the X-ray therapy could not do any more good, we decided to give radium treatment.

She was admitted to the Post-Graduate Hospital on Sept. 7, 1928. Biopsy was taken with a snare—a piece of the tumor about the size of a peanut being removed under cocain adrenalin. Very slight bleeding, no pain, temperature 99.2°.

Three days later the temperature went up to 103° and the left eye became very edematous.

On Sept. 13, the left eye and left side of the face were markedly swollen and there was a pus pocket formation in the inner angle of the left eye. Temperature was running up to 103°. It was decided to drain the nose by removing the tumor which was blocking the ethmoid cells. I removed six pieces of tissue under local anesthesia. The pus discharged freely from the ethmoid. There was surprisingly little bleeding; the lower portion of the tumor could not be removed as I was not able to get around with the snare. The patient's condition turned worse; the temperature went up to 104.6°.

On Sept. 15, an abscess in the external angle was opened up and drained. The patient was in a semi-comatose condition, with a temperature fluctuating between 104° and 106°.

Patient expired on Sept. 20, 1928.

An autopsy was made with the permission of the husband. The tumor involved all the sinuses except the right frontal and originated from the pituitary gland.

Microscopic report shows tumor suggesting probable pituitary origin. Neoplastic in character.

124 East 84th Street.

SOME USEFUL ROUTINE OFFICE PROCEDURES.*

DR. M. VALENTINE MILLER, Philadelphia.

It has occurred to me that it might be a help to call attention to three relatively simple procedures which can easily be performed as office treatments, and which, in many cases, afford great relief to the patient. For some reason they seem to be unknown or are overlooked by many men. They do not by any means clear up every case. Indeed, they seem to have little or no effect upon some, but they are successful in a large enough percentage of cases to be always kept in mind. In those cases where they are successful the results are spectacular and make an enduring friend of the patient. These three procedures are: *a.* Cocainization of Meckel's ganglion for relief of pain in various locations about the head and neck. *b.* Relief of deafness and tinnitus which is largely due to Eustachian tube catarrh, by the use of the Yankauer applicators. *c.* Relief of vacuum sinus pain, and prevention of its recurrence, by simple infraction of the middle turbinate or removal of its tip.

a. Some enthusiastic writers have claimed relief of pain and discomfort almost anywhere from the top of the head to the sole of the foot by cocainization of Meckel's ganglion. In this paper, however, we will confine ourselves to a few of the conditions which may at any time confront the otolaryngologist, and which may frequently be relieved by cocainization of the ganglion.

The ganglion may be reached through the nasal cavity. It lies in the sphenomaxillary fossa just under the superior maxillary division of the trifacial, or fifth cranial, nerve and is in close proximity to the sphenopalatine canal which opens into the nasal fossa just anterior to it. This foramen is situated in the nasal fossa immediately above and slightly posterior to the posterior tip of the middle turbinate. It is at this point where the local applications are made in cocainization of the ganglion, and through this foramen that the ganglion is injected when it is desirable. (Recently an approach for injection has been described, going through the posterior palatine canal.) Because of the position of the ganglion between the sphenoid and maxillary sinuses, it may be affected by inflammation of these sinuses.

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The ganglion derives its sensory root from the superior maxillary nerve through the sphenopalatine nerves. Most of the fibres of these come from the Gasserian ganglion but some are from sympathetic ganglion cells.

The motor root is from the facial nerve through the great superficial petrosal nerve. This root is said to carry sensory fibres also.

The sympathetic root comes from the carotid plexus through the great deep petrosal nerve. The two great petrosal nerves join to form the Vidian nerve, which passes to the ganglion through the Vidian canal. While passing through this canal the nerve gives off small branches to supply the posterior part of the roof of the nose, the posterior part of the nasal septum and the pharyngeal opening of the Eustachian tube.

The ganglion sends ascending branches to the sphenoid and posterior ethmoid cells and also to the periosteum of the orbit.

The descending branches supply the mucous membrane of all but the anterior part of the inferior turbinate and the adjoining portions of the middle and inferior meatuses; the hard palate and its mucous membrane; the inner side of the gum; sensory fibres to the mucous membrane of the soft palate and to the tonsil; motor fibres to the levator palati and azygos uvulae muscles.

The internal branches supply the mucous membrane of the outer posterior portion of the nasal fossa, the roof of the nose and the nasal septum and that portion of the hard palate just posterior to the incisor teeth.

The posterior branch supplies the mucous membrane in the region of the fossa of Rosenmueller.

A typical case of sphenopalatine ganglion neurosis, or Sluder's syndrome, will show more or less coryza, followed by pain at the root of the nose, in and about the upper jaw and teeth, temporal and zygomatic regions, ear and the mastoid, being most severe at a point about 5 c.m. posterior to the mastoid. There is pain in the occiput, neck, shoulder and scapular regions, at times passing down to the fingers. There may also be discomfort in the throat and palate, pain inside the nose, taste may be perverted, salivation may be increased and there may be scintillating scotoma.

The above describes the full syndrome but one need not expect that he requires the complete picture to direct his attention to the ganglion. As a matter of fact, there may be only a few of these symptoms present and yet tremendous relief may be gained by cocainizing the ganglion. The treatment has been used with success in relieving the pain in otitis media; in the relief of earache incident

to malignancy of the larynx; in glossodynia and in vasomotor disturbances of the nose, with excessive secretion and sneezing. As Sluder says, many of these conditions cannot be recognized as due to any pathology in the region of the ganglion, but nevertheless the pain of these conditions is frequently controlled by treatment of the ganglion.

The following are a few cases briefly showing what may be accomplished:

Case 1: Mrs. MacK., age 51 years, had pain in the right side of her head off and on over a period of about six years. Had had nose and throat treatments by a rhinologist during that time with indifferent success. Had had pain for about five days before she came to the office, the whole right side of her head was involved and both upper and lower teeth ached on that side. There was continual ache in the right ear and behind it, the pain at times passing down almost to the right shoulder. The headache seemed to be relieved for a short while when she laid down and used hot applications. There was no nasal obstruction, no nasal discharge, no deafness and no tinnitus. There was no tenderness, except a slight amount over the right mastoid region. The eardrums were negative, except for some retraction. There was no sign of sinus involvement. The nasal fossae were negative, except for a slight impaction of the left middle turbinate against the septum. There was some hypertrophy of the lymphoid tissue of the pharyngeal wall. The tonsils had been removed.

A 10 per cent solution of cocain was applied to the area just behind and above the posterior tip of the right middle turbinate and within less than five minutes all of the pain had disappeared, much to the amazement of the patient. Eight days later there was a reappearance of the pain, which was again immediately relieved by the local application of cocain. There were slight recurrences three days later, and again 10 days after that, but each time the cocain gave relief. The patient was not seen again for about seven months, when she reported that she had been free from the pain since her last treatment.

Case 2: Mrs. B., age 45 years, with carcinoma of the epiglottis and base of the tongue, complained greatly of pain shooting up to her left ear. This was accompanied by pain over the left side of her head and neck. Relief was at once obtained by anesthetizing the left sphenopalatine ganglion.

Case 3: Miss D., age 43 years, came to the office complaining of "neuralgic" pain in the left malar region, at times extending to the

back of the ear and down into the lower jaw. She had thought the pain due to dental origin and had had her dentist make an examination. No cause for the trouble was located there. Although she had had a double maxillary empyema over a year before, no sign of sinus involvement was found at this time. A 5 per cent solution of butyn was applied over the ganglion and the pain immediately disappeared. Although there was no recurrence of the pain, the anesthetic was applied again several days later. She was seen about one month later, when she reported entire freedom from pain.

b. The next group of cases are those of deafness and tinnitus due wholly or in part to obstruction of the Eustachian tube through thickening or chronic congestion of the mucous membrane lining the tube. These patients come to the office usually with the history of having gone from place to place and having their ears "blown out" time and again without improvement in their condition. It must be kept in mind that in these cases, before any treatment can be directed to the Eustachian tube with any hope of success, any causative factor must first be corrected. These include hypertrophied or diseased tonsils and adenoids, chronic sinus involvement, and nasal obstruction from deflected septum or enlargement of the turbinates. After these items are disposed of, success will more likely attend the treatment of the tubal condition. These cases may be inflated and the pharyngeal orifices of the Eustachian tubes shrunken time on end with no improvement, but the situation is different when the manipulation and the medication is carried directly into the tube and the lining mucosa directly attacked.

The method of procedure is carried out by the use of the Yankauer applicators. These consist of a long, thin steel wire bent in the middle and the two ends twisted their entire length, the resulting instrument being a wire applicator about 9½ inches long, with a small loop on the end, and small enough to allow of passage through the tube, even thought the end be wound with cotton. This applicator must be used with a special handle made for it. This handle is a hollow tube, 9½ c.m. long, with a set-screw at one end. Beginning about at the middle of this tube there are divisions marked going down toward the screw. Starting at the middle there are two divisions, each 10 m.m. long, next there is one 5 m.m. long and after that there are six, each 2 m.m. long, making a total of 37 m.m. measured distance. This corresponds to the average length of the Eustachian tube, the cartilaginous portion being about 25 m.m. long and the remaining 12 m.m. forming the osseous portion.

An Eustachian catheter, a No. 2 is usually the best, is selected and, after inserting the applicator into the handle, the applicator is passed

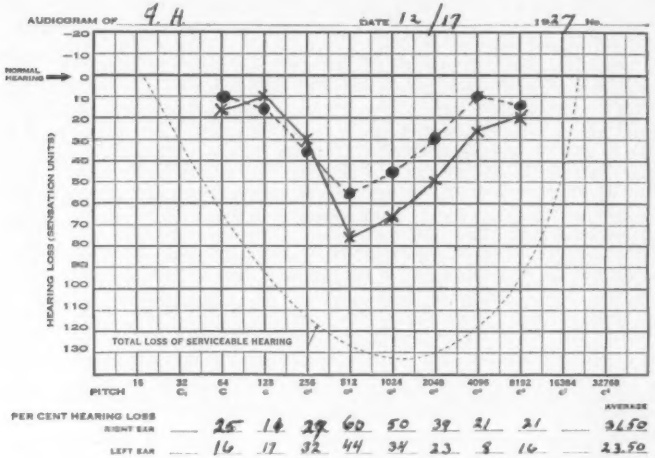
into the catheter until the tip of it is on a level with the tip of the the catheter, we will have just 37 m.m. of applicator protruding from the first mark in the middle will be on a level with the proximal end of the catheter. When this is done the screw is set. It will now be seen that when the handle with the applicator is pushed into the catheter until the last mark on the handle has just disappeared into catheter, we will have just 37 m.m. of applicator protruding from the other end of the catheter, or enough to be in contact with the entire length of the Eustachian tube.

After this has been attended to, a very thin bit of long fibre cotton, about 2 inches long and about 1 inch wide, is taken. This is laid on the fingers of the left hand, the applicator taken out of the catheter and the end of it laid on the cotton at one side. The applicator is then rotated, winding the cotton evenly about the wire. The cotton extending beyond the end of the applicator is cut off and the applicator is ready for use. The cotton is saturated with the desired strength of cocain solution, 4 or 10 per cent, or, as I prefer, a 3 per cent solution of ephedrine hydrochlorid. Catheterization of the Eustachian tube is carried out under the usual technique, using a diagnostic tube to be sure that the catheter is directed into the Eustachian orifice. The Yankauer applicator is then inserted into the catheter while the latter is held firmly in place by the left hand, with the last two fingers placed on the bridge of the nose to prevent slipping. As soon as the handle is in to the first mark we know that the tip is just at the mouth of the tube, and it is gently pushed in. If obstruction is felt, the applicator is held in position with gentle pressure. Soon the solution on the cotton will cause a shrinkage of the mucous membrane, allowing the applicator to pass on. Usually it will pass freely until the first two marks of 10 m.m. each have disappeared, frequently the 5 m.m. mark in addition. At this point we have reached the most narrow point in the canal, the isthmus, where the cartilaginous and the bony portions of the canal join. Here we may be held up for some time until sufficient shrinkage occurs to allow the applicator to pass. When the last mark has just disappeared into the catheter we know that we are at the opening of the tube into the middle ear and that further insertion might cause damage. A point to remember when stuck at the isthmus is that at this point the tube is about twice as high as it is broad, and if the applicator is rotated slightly, so as to allow the flat of the loop to lie in the greatest diameter of the tube, it will frequently pass through with greater ease.

The applicator is allowed to remain in place for 15 to 30 minutes, depending upon the case. It is then withdrawn, saturated again, but

this time with a solution of 1 per cent iodin in glycerin, argyrol, or whatever medication it is desired to carry in. It is then reinserted and this time the operator will notice that there is no difficulty with obstruction and that it passes through readily. This time the applicator need not be allowed to remain more than a short while as the previous application of the shrinking solution and the pressure have accomplished all of the shrinking possible for the time.

This treatment may be repeated at intervals of three days at first, gradually lengthening the periods between treatments as the patient responds. Results can be most successfully checked up by the use of the audiometer and the graphic representation of the hearing con-

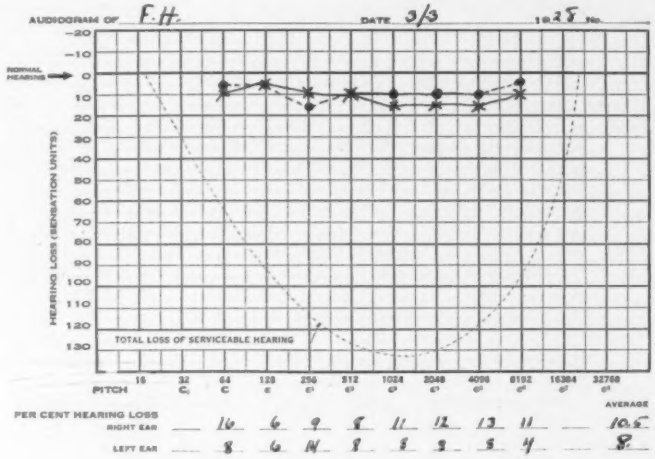

AUDIOGRAM OF F. H.
DATE 12/17
1927
NORMAL HEARING
HEARING LOSS (SENSATION UNITS)
TOTAL LOSS OF SERVICEABLE HEARING
PITCH
PER CENT HEARING LOSS
RIGHT EAR 25 14 27 60 50 39 21 21 AVERAGE 31.50
LEFT EAR 16 17 32 44 34 23 8 16 23.50

dition will have a most excellent effect upon the patient and the patient's family.

The following cases with the audiograms show what may be accomplished:

Case 1: F. H., a school boy, age 10 years, came to me in December, 1927, with a history of deafness of some years' standing. No history of suppurating ears or sinus involvement. About one year before had had pain in the right ear but no discharge. Had been put in a special class for deaf children in school. Both drums were found to be retracted, no scars or perforations. Nasal septum deflected to right but was not interfered with on account of his age. The nose was otherwise negative. Tonsils had been removed. The audiogram showed a decided loss of perception for the tones of the

middle register. The first audiogram shown below gives the condition as it was found on Dec. 17, 1927, before treatments were begun. Treatments were carried out with fair regularity up to March 3, when the audiogram showed a marked improvement, the hearing being very nearly normal. Early in April the boy developed a "cold" and did not show up for treatments until late in May, when it was found that his hearing had gotten worse again and was in practically the same condition as when first seen. During the summer he neglected his treatments entirely and did not appear for treatments until made to do so by his teacher in the fall. Since school opened he has again been reporting with fair regularity. His last audiogram was

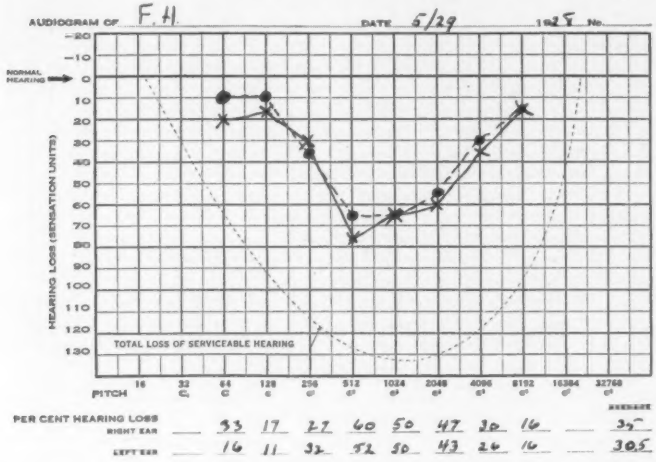

AUDIOGRAM OF F. H.
DATE 3/3
1928 No.
NORMAL HEARING
HEARING LOSS (SENSATION UNITS)
TOTAL LOSS OF SERVICEABLE HEARING
PITCH
AVERAGE
PER CENT HEARING LOSS
RIGHT EAR 16 6 9 8 11 12 13 11 10.5
LEFT EAR 8 6 14 8 8 9 8 4 8

taken Jan. 26, 1929, and shows a distinct improvement. The right ear now shows only an 11 per cent hearing loss as over against a 35 per cent loss found after his "colds" of last spring. The left ear shows a loss of only 9.25 per cent as against 30.5 per cent.

Case 2: Sarah Z., a school girl, age 10 years, came in with a history of a discharging ear on the left following measles at the age of three. Discharge continued for four years. Mother says her deafness is very noticeable. Left drum membrane much distorted by scars and apparently adherent to inner wall of the middle ear. Right drum much retracted. Tonsils have been removed. Double deflection of the septum. (No surgical interference due to her age.) No evidence of sinus involvement. Blood Wassermann negative. Audiogram showed a marked deafness on the left side with a hearing loss

of 78.35 per cent. The right ear showed a mixed deafness with a loss of 35.2 per cent. At the end of five months of irregular treatment the mother reported a marked improvement and the audiogram taken at that time showed that the hearing loss on the right side had been reduced to 16.37 per cent. No treatment was instituted on the left side.

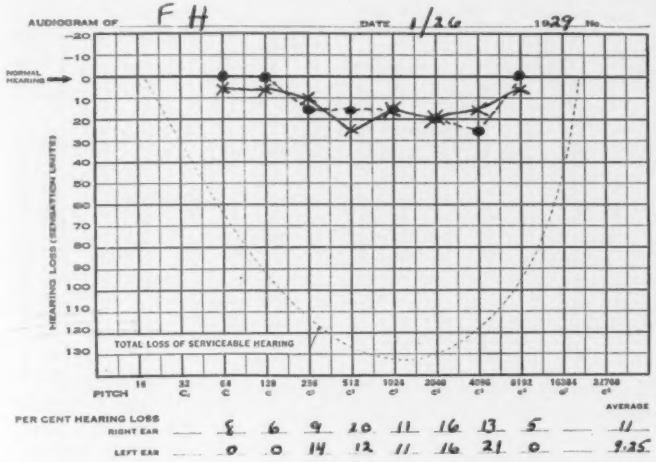
The next case represents a group of cases where there is annoying tinnitus with little or no noticeable deafness—where there is just enough congestion of the mucosa of the tube to produce tinnitus but not enough to produce noticeable deafness. These cases are quickly relieved by the Yankauer treatment.


AUDIOGRAM OF F.H.
DATE 5/29
1925 No.
NORMAL HEARING
HEARING LOSS (SENSATION UNITS)
TOTAL LOSS OF SERVICEABLE HEARING
PITCH
PER CENT HEARING LOSS
RIGHT EAR 33 17 27 60 50 47 30 16 35
LEFT EAR 16 11 32 52 50 43 24 16 30.5

Case 3: Mrs. M., age 27 years, had an annoying tinnitus and a sensation of there being, as she described it, "a bubble in the ear". This had been present off and on for about three years or more, but lately had been more troublesome since the beginning of pregnancy. Both ears affected but more marked on the right. Says she can get relief by rubbing downward on her neck back of the angle of the jaw. On examination hearing was found to be practically normal. Both drums were slightly retracted. Right middle turbinate much enlarged, apparently due to a cell in its tip. Septum deflected to the left. Tonsils buried, pillars injected. No surgery was advised at the time, due to her pregnancy. Relief was gained at once by the use of the Yankauer applicators and by keeping down nasal conges-

tion by the use of ephedrine. The Yankauer applications were kept up at intervals up to the delivery of her child, when the condition seemed to disappear. About two months later the symptoms reappeared and she again came for treatment. Turbinectomy was advised and performed, though she refused submucous resection. Improvement followed but she still occasionally appears for treatments, which she says are a great help. Tonsillectomy is to be performed as soon as the patient can leave her baby for a few days.

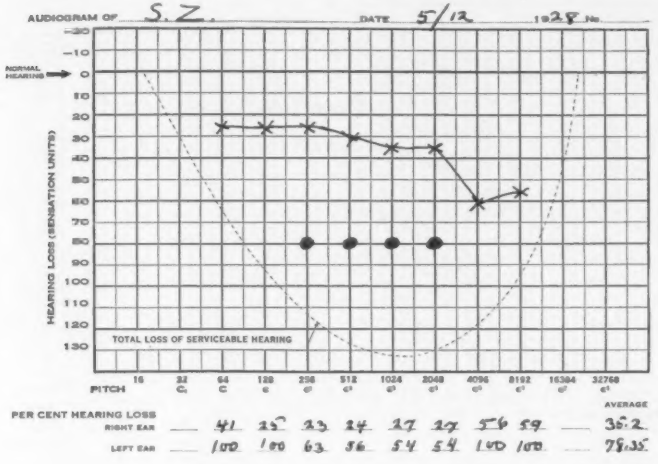
c. The last group of cases we will discuss are those of vacuum sinus headache. The frontal and maxillary sinuses are those in which the diagnosis is most usually made, though, from the very nature of the condition, it may occur in any of the various accessory


AUDIOGRAM OF F H
DATE 1/26 1929 No.
NORMAL HEARING
HEARING LOSS (SENSATION UNITS)
TOTAL LOSS OF SERVICEABLE HEARING
PITCH
AVERAGE
PER CENT HEARING LOSS
RIGHT EAR 8 6 9 20 11 16 13 5 11
LEFT EAR 0 0 14 12 11 16 21 0 9.25

air spaces of the nose. The condition is brought about by a congestion of the mucous membrane about the ostium of the sinus involved. This may be caused by any acute congestive process in the nose but is usually predisposed to by anatomical relations about the ostium, such as narrowing of the nasal fossa by a deflected septum; by enlargement of the middle turbinate by an aberrant cell in its tip; the middle turbinate may be in unusually close proximity to the lateral nasal wall; there may be unusually small ostiums or a very narrow hiatus semilunaris. In any of these conditions a small amount of congestion of the mucosa, added to the pre-existing narrowing, may cause marked symptoms. More often, however, the condition is brought about by hyperplastic tissue covering a portion of the

middle turbinate or its subadjacent tissues. This may be evidenced by the appearance of a true hypertrophy of the mucosa covering the tip, by a simple edema or by the presence of polypi.

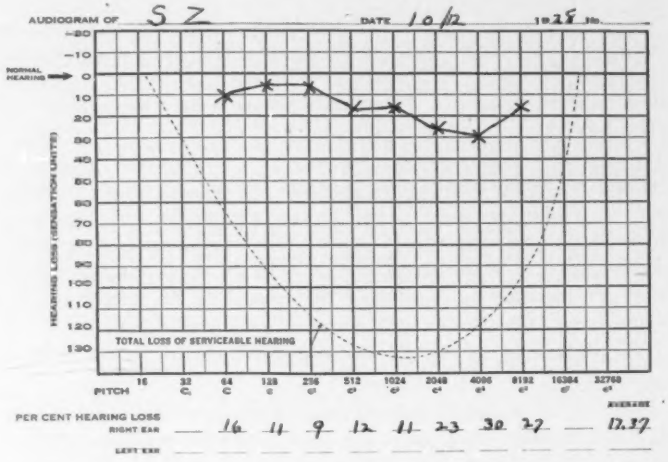
The symptoms of a vacuum sinus may be almost, if not quite, as severe as those of a pus involvement. There are several points of difference, however, which will simplify the making of the diagnosis. In the first place there is not the same regularity in the time of onset of the pain each day, as compared with the almost clock-like regularity so often found in pus cases. Patients will say that the pain is relieved by the application of heat. In the average case there is not the same severe intensifying of the pain on motion of the head. There is no fever, no nasal discharge, and frequently no increase in


AUDIOGRAM OF S. Z.
DATE 5/12 1928 No.
NORMAL HEARING
HEARING LOSS (SENSATION UNITS)
TOTAL LOSS OF SERVICEABLE HEARING
PITCH
AVERAGE
PER CENT HEARING LOSS
RIGHT EAR 41 25 23 24 27 27 56 59 36.2
LEFT EAR 100 100 63 56 54 54 100 100 78.35

nasal obstruction noted by the patient. On intranasal examination there is an absence of discharge and there may be even a total lack of evidence of any acute condition. There will in all probability, however, be one or more of the conditions of anatomical or pathological nature mentioned above.

These anatomical and pathological conditions mentioned cause a blocking of the sinus openings, so that there is not a normal passage of air in and out of the sinuses. As a result the lining mucous membrane absorbs the contained air and produces a negative pressure of greater or less severity. This negative pressure in turn produces a passive congestion of the vessels of the lining mucosa. Upon the

amount of congestion depends, I believe, the presence and the severity of the pain produced by straining and movement of the head. In some cases there may be sufficient congestion of the mucosa to hinder the transmission of light on transillumination tests. Heat locally applied causes a congestion of the vessels, but here it also acts to expand whatever air there is remaining in the sinuses and so reduces the negative pressure, which in turn will reduce the passive congestion incident to it. I have had many patients tell me that they would go to bed with a hot water bottle on their foreheads in order to go to sleep. One patient said that night after night he would get out



of bed, go to the cellar and open the furnace door and sit in front of it by the hour as the only means of getting relief.

The symptoms of vacuum frontal headache are: pain over the frontal region, with tenderness over the sinus, more marked on the floor at its thinnest point, which is just posterior to the attachment of the pulley of the superior oblique—this is the so-called Ewig's sign; increase of pain on ocular movement, due to the proximity of the pulley to this thin point; the pain may follow the course of the anterior nasal nerve and produce pain in the eye, frontal sinus and anterior portion of the nose; pain is relieved by heat and does not have the same periodicity as pus cases; there is usually absence of intranasal symptoms of any acute condition. The increase of the

pain upon ocular motion may cause a suspicion that the eyes are at fault. Correction of refractive error, if any, will not relieve the pain and the case against the sinus is more complete.

The symptoms of vacuum maxillary sinus pain are: unilateral pain, which is frequently localized above the eye to such an extent that the frontal sinus is regarded with suspicion; there may be tenderness on percussion over the antrum; frequently the teeth on the affected side have a sensation of being too long; irregularity of pain in point of time; sinus symptoms, with absence of intranasal signs; relief of pain by heat.

In any case of vacuum sinus pain there is immediate relief of the pain when air is allowed to enter the sinus. The cause of the obstruction determines the method to be used in giving relief. If the case is one of simple congestion, frequently shrinking of the mucosa under the tip of the middle turbinate will give relief. If polypi are present they must be removed. Submucous resection may be required. In maxillary cases a simple needle puncture will give relief, though it does not remove the cause. Infraction of the middle turbinate or removal of its tip are the most generally useful and successful measures of giving permanent relief, as it is the middle turbinate which is at fault in the majority of cases. There are some cases in which needle puncture of the antrum seems to be the only means of making a definite decision as to whether the frontal or the maxillary sinus is involved. Frequently both occur in the same patient.

The following cases will illustrate the results which may be expected:

Case 1: J. S., age 41 years, an executive spending most of the day in a factory office, had been having left frontal headaches for some months, usually during the day and disappearing during the late afternoon. He could always breathe better and was free from pain during cool, clear weather. Pain was worse in damp weather and when he was in an overheated house or office, this latter probably accounting for the rather regular appearance of the pain during the time when he was in his office. There was some slight increase in the pain on stooping or when straining at stool. The only tenderness present was over the left inner canthus. Intranasal examination showed an enlarged tip of the left middle turbinate. This was removed by the snare and the patient received relief. He has been free from headaches, except an occasional one incident to acute conditions, for the past two-and-a-half years.

Case 2: P. U., age 30 years, had had left frontal pain almost continuously for several days and irregularly for several months.

There was pain in the left eye, headache was so severe that he could not sleep, and the only way he could get relief was to sit in front of the open furnace door. Tenderness was general over the left frontal and maxillary regions and it was impossible to say which sinus or whether both were involved. The tip of the left middle turbinate was enlarged and placed close against the lateral nasal wall. Following removal of the anterior tip of this turbinate, complete relief was gained.

Case 3: F. S., age 37 years, a physician, had had an acute "cold" with marked left-sided headaches coming on at any time during the day or night. The pain was very severe and had appeared on previous occasions whenever there was any nasal congestion. The only tenderness was over the antrum. Intranasal examination showed a congested nasal mucosa with a rather free, watery secretion and no pus. The left middle turbinate was not enlarged but was in unusually close proximity to the lateral nasal wall, so close that, even after shrinking, it was almost impossible to insert an applicator, with a small amount of cotton, under it. The turbinate was infracted toward the septum and the pain at once disappeared. Care was taken during the ensuing days to see that the bone remained in its new position and healed there. After more than three years there has been no return of the pain.

114 West Phil-Ellena Street.

TEACHING OF OTOLARYNGOLOGY TO UNDERGRADUATES.

Dr. Ellison L. Ross, Waukegan, Ill.

Everywhere we find evidence of our failure in teaching the diseases of the ear, nose and throat. It is rare to find a general practitioner of medicine who can examine a nose and even recognize a real nasal obstruction, to say nothing of sinus disease. An otitis media is diagnosed first when the ear begins to run. The internes in the hospital take little interest in otolaryngology, other than in the removal of tonsils. Even indications for tonsillectomy and the after-treatment of tonsillectomy are of little or no interest to them. The average senior medical student cannot find the eardrum or the middle turbinate. To him all tonsils are "hypertrophied" and "ragged".

There are two reasons for the present lack of knowledge of the general physician, interne and medical student of things pertaining to ear, nose and throat. First, the medical curriculum is so crowded that a very limited time is allowed to otolaryngology. Second, the methods of teaching the most important part of the subject, the dispensary work, are usually complete failures.

The time allowed our subject in the medical course is very short. With the many specialties of equal importance, we cannot demand more time for our students.

The method of teaching clinical otolaryngology in the past has been, first, a period of ease and entertainment for the students; and, second, a time for the instructor to review his successes. The small part of the student's time spent in attention is occupied in being told about conditions before him, when he should be discovering them himself. This practice is common. The instructor takes his case and first gets a specialist's complete history. He explains the importance of each detail. Second, he examines the case and possibly lets a student or two look at some particular pathology. The student most of the time does not see it, but politely agrees with the instructor. Third, the diagnosis and differential diagnosis is discussed completely. Fourth, the treatment is discussed. The medical treatment in the acute, subacute and chronic condition differs. The surgical treatment is complex. The indications for operation are covered

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by the doctor. The technique of the surgical procedure varies with the pathology found.

Too often the instructor innocently drifts into nonethical narration of his cases. It is easy and pleasant to relate one's successes. Between doctors it is perfectly proper to privately mention names of patients, the financial or social status of the people one is dealing with, and the failures that preceding doctors have had, but is it proper to do this before classes of students? Second, do such details in the presentation of one's cases teach the student, graduate or postgraduate any real medicine? Third, should dispensary time be consumed at all with case histories of distant patients? Man's best teacher is experience, and his next best is the history of others' experiences. If this is true, our question is answered, as the dispensary is where experience is waiting for every student.

The old method of teaching in the dispensaries, as described, is like teaching a child in the first grade the origin of the alphabet, the history of the written language, simple reading in a primer, spelling, the beauties of rhyme and rhythm, poetry and poets, drama, novels and novelists, etc. Imagine covering all this which is involved directly or indirectly in a child's daily reading lessons. How much time would be wasted? How fast would the child learn to read? The medical student must first become able to "read" his ears, nose and throat. In other words, he must first be able to see and examine the ears, nose and throat; and, second, to recognize the signs of disease. After this is done, it does not matter how haphazard the knowledge in otolaryngology comes to him, it can be added to this foundation. Without this, any amount of symptomology, pathology, etiology, diagnosis, prognosis and treatment is as useless as the largest and most wonderful ship without a rudder.

DISPENSARY COURSE OF INSTRUCTION.

First, there are three important things to be accomplished. The student must learn to use the commonest instruments of the specialty. He must be taught to observe details. Normal parts are to be recognized.

To accomplish these three things, at least six two-hour periods of intensive work are necessary. There should not be more than six or eight students with an instructor. The students are paired for the course. They examine each other. The work for each day may be as follows: *1*. Tonsils and Pharynx. *2*. Turbinates. *3*. Septum and Larynx. *4*. Sinuses. *5*. Ear Structure, and *6*. Ear Functions. A tabulation sheet may be given out to each student each day. This sheet may have a number of details mentioned, with spaces to be

filled out with observations on four cases to be examined. The enumerated details should usually be important ones in the practical examination of a case, but may include some others which enforce a close examination of structures. The following might be the partial outline for the day on which turbinates were studied:

STUDY OF TURBINATES.

Name of Patient									
Inferior Turbinate	Right	Left	Right	Left	Right	Left	Right	Left	Normal
Color									
Texture									
Solidity									
Thickness									
Anterior End									
Posterior End									
Distance									
Anterior End									
Septum									
Floor									
Lateral Wall									
Posterior End									
Septum									
Floor									
Lateral Wall									

Observations should be written down on the tabulation sheet as made. At the end of the period the instructor should spend 10 minutes in summarizing the subject.

There are a number of advantages of this preliminary course. The students are as normal a group of individuals as the instructor can find. While one student is learning, as the doctor, how to examine and use the instruments, the other student, as a patient, is acutely learning how the instruments should not be used. There is rapid learning when this condition exists. The tabulation sheet enforces the observation of details to the maximum. This is one of the most important things to be accomplished in otolaryngology, as well as in all other parts of medicine.

After six or more days have been spent in examining each other, the students should begin work with patients. Not more than two students should be assigned to each doctor for the course. During the first 15 two-hour periods in working with patients, the work should be of a certain restricted character. A complete otolaryngo-

logical examination should be given to every patient, and should be required of every student. He may examine the nose and sinuses and when done with this, report to the instructor. The instructor may ask, "Is there disease of the nose or sinuses?" The student answers "yes" or "no". The instructor asks what he has seen in the nose. The student describes the nose, noting in detail everything, normal or abnormal. Not a single detail of importance should be omitted by the student. The instructor should not have to ask about this detail or that. Next, the student examines the throat and reports his findings in a similar manner. Then the ear is examined and discussed in the same way. After each student's report on the part, nose, throat or ear, the instructor should add his comment on the physical findings. When the examination is finished, the diagnosis and treatment may be mentioned, but not discussed. The student should be put on another case immediately, while the instructor finishes the care of the first patient. The student should see as many cases as possible. From the first until the last day, the student should in every case recite every detail of the ear, nose and throat in reporting his findings.

There are a number of things that should not occupy the student's time in the dispensary at this stage of his development. Half an hour used awkwardly taking a history is not worth as much as this time spent in examining cases. To know that the patient is deaf in the left ear, has sore throat, cold in the head, or pain in the ear, is all that is necessary for the student to know at this time. A discussion of special anatomy and pathology is not worth that time spent in examining cases. The general anatomy and pathology which the student already has is sufficient. Anything beyond this is proper for the training of the specialist. Diagnosis, medical and surgical treatment are too advanced for the student at this stage and should not be more than mentioned. Time spent in watching surgical operations during dispensary period is just the same as time lost. Examination of patients is infinitely more valuable.

At the end of the course a practical examination should be given. This test can be conducted so that the student's report is taken orally or written. If the student is found deficient in methods of examination, observation of details, or the power to recognize the common signs of disease, he has failed, as in any other course.

If the curriculum of the medical school and the size of the faculty of the department would allow the students to spend more than 21 periods in the dispensary, more advanced work could be attempted. If the medical course does allow the time for the student, it is usually

for such large groups of students that only a part of the group can be taken care of at a time because of a lack of instructors. There must be half as many doctors as students to the group to do passable work.

The course is essentially one of "looking and seeing". The mastery of instruments and technique with the use of the eyes makes "looking" possible without the accumulated data obtained by "looking" at a considerable number of cases, the student develops the power to "see" disease and normalcy in ears, noses and throats.

CLINICS AND LECTURES.

There is little to criticize in the clinics and lectures given to undergraduate students in otolaryngology. Sometimes the instructor forgets that he is training men to practice general medicine and surgery. It is a strong temptation to present a difficult mastoid case, rather than one of tonsillitis. To the instructor, it is much more interesting to show and discuss a case of sphenoid disease than one of acute rhinitis. Our students in their future years will care for the simple and frequent conditions thousands of times, where the complex ones will never be handled. Therefore, it cannot be emphasized too strongly, that the simple and frequent conditions should take up the time of our clinics. Operations before undergraduates have little excuse.

SUMMARY.

Intensive work with the student in the dispensary is the key to better success in teaching of otolaryngology to undergraduates. Close supervision and concentrated effort on examination and observation of details are the essentials. Then in the future we will have, what we do not have now, a group of physicians outside of our specialty who can examine ears, nose and throat and recognize the common signs of disease.

215 N. Sheridan Road.

International Digest of Current Otolaryngology.

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St. Louis Jewish Hospital E.N.T. Journal Club.

The dedication ceremonies of the new buildings of Central Institute for the Deaf, in St. Louis, were held June 19. The new buildings were used for the Twelfth Annual Meeting of the Society of Progressive Oral Advocates and the commencement exercises of the Summer Normal Training Class.

Dr. Max Meyer, the eminent psychologist of the University of Missouri, has volunteered his services to Central Institute for the Deaf, in St. Louis, for the ensuing year. Dr. Meyer has long been interested in the psychology of the deaf child and is at present working on some problems in this field.

Guttman, of Chicago, in the July, 1929, issue of the Illinois Medical Journal, reports on the use of barbituric hypnotics in the prevention and treatment of cocain intoxication. He experimentally was able to show that barbital and phenobarbital have a very close antagonistic pharmacodynamic action to cocain, thus allowing the usual local effect of cocain but inhibiting the general effects. He uses it as a prophylactic, giving either 3 gr. of phenobarbital or 10 gr. of barbital one-half hour before operation. In mild intoxication with cocain, he suggests the hypodermic use of the above drugs given in their sodium salt (3 gr. of sodium phenobarbital or 10 gr. of sodium barbital). For severe intoxication the above doses are given intravenously and repeated until convulsions stop.*

M. R. G., *Chicago.*

Vogel, in the Zeitschrift fur Hals, Nasen und Ohrenheilkunde, February, 1929, reports on the microscopic relationship between atrophic rhinitis and the sphenopalatine ganglion. He concludes from his work that in genuine atrophic rhinitis there is an isolated atrophy of the sphenopalatine ganglion but the other ganglia remain normal.

*N. B.—The reader's attention is drawn to the report in The Laryngoscope, June, 1929, International Digest of Current Otolaryngology, on Heindl, of Vienna, who uses veronal by mouth prior to operation.

He can advance no proof that such a primary disease of the ganglia is responsible for atrophic rhinitis. He considers the ganglion condition secondary. FINEBERG, *St. Louis.*

Pearlman, Kahn and Kunde, of Chicago, reported to the Middle Section of the American Laryngological, Rhinological and Otological Society, in Chicago, at the January 9, 1929, meeting on the histopathology of the nose and throat in experimental cretinism. They produced a marked skeletal change with pronounced cretinism in young rabbits, by the removal of both thyroid glands. Except for a stunting of size of the organs of the upper respiratory tract, there was no marked pathology. Microscopically there was no infiltration of abnormal cells.

In the discussion following this paper, it was brought out that many of those disturbances of the nose and throat which had been set down as possibly due to thyroid glands are not based on real facts. The authors will undoubtedly have much more valuable information on this endocrine relation as their experiments continue.

FINEBERG, *St. Louis.*

Otto Mayer, in the Journal of Laryngology and Otology, 1928, 43, 843, in discussing the pathology of otosclerosis, concludes that areas of Otosclerosis are hyperplasias. He reaches this view not only on the histologic appearance but on the typical and symmetrical localizations, the presence of tiny islands of atypical tissue, the condition of hyperplasia of the temporal bone generally coincident with blue sclerotics and other conditions, and lastly the hereditary factor.

FINEBERG, *St. Louis.*

Mackenty, in the Archives of Otolaryngology, 1929, 9, 327, contributes a well rounded out monograph on laryngeal cancer. Quite as interesting as his actual scientific data are a few of his dictums: "Surgical measures applied early give better results in cancer of the larynx than in cancer in any other part of the body." "Radium has been an utter failure in treatment of cases of squamous cell laryngeal cancer; its false promises are leading thousands beyond the aid of surgical procedure." "If the public mind could be oriented on one fact,—that progressive hoarseness is a danger signal,—and if the medical profession would urge a thorough and competent investigation of this danger signal, if the entire truth were told about radium and if the laryngologists would heed the dictates of general surgical measures in the treatment of persons with cancer, *i. e.*, radical removal, laryngologists would be doing their very best for their

allotted 5 per cent share of patients with this dire disease and would eradicate to a large extent the unspeakable misery attendant on uncontrolled laryngeal cancer."

Such definite, clearly told facts, based on a large experience and backed by the scientific mind of Mackenty, should undoubtedly be of interest not only to the laryngologist but to every physician and surgeon.

FINEBERG, *St. Louis.*

Aron, in the Klinische Wochenschrift, 1929, 8, 167, discussed the use of diathermy in tonsillectomy. Instead of using blunt or sharp dissecting instruments, he used the flat tip of the cold cautery. Operative and post-operative bleeding is greatly minimized by this method and the only disadvantage seems to be the relatively trivial fact that after operation the local reaction in the wound is somewhat greater than that following the original method of dissection.

FINEBERG, *St. Louis.*

Barlow of Madison, Wis., in THE LARYNGOSCOPE of September, 1927, reported a series of experiments which proved that the deficiency of Vitamin D is not in itself a factor in loss of hearing. In the Archives of Otolaryngology of 1928, 8, 629, he further reports on the possibility of other vitamins producing disturbances in the ear, nose and throat. In his experiments he fed rats on a diet deficient in fat soluble Vitamin A and Vitamin B; he then sectioned the bony capsule and found that the lack of these vitamins was not a factor in bone changes in the internal ear; however, an absence of Vitamin A does produce changes in the mucosa of the respiratory tract which may even extend to the soft tissue of the middle ear and thus produce some change in the hearing mechanism.

FINEBERG, *St. Louis.*

THE AMERICAN BOARD OF OTOLARYNGOLOGY.

An examination was held in Portland, Ore., July 8, during the meeting of the American Medical Association. Thirty-seven applicants appeared for examination, with 11 per cent failures.

The next examination will be given on Monday, Oct. 21, in Philadelphia, preceding the opening of the meeting of the American Academy of Ophthalmology and Otolaryngology in Atlantic City.

Prospective candidates for certificates should address the Secretary, Dr. W. P. Wherry, 1500 Medical Arts building, Omaha, Neb., for proper application blanks.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION OF OTOLOGY.

February 8, 1929.

The Window Operation for Hematoma Auris and Perichondritis with Effusion. Dr. Robert C. Howard.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. GEORGE E. DAVIS: I wish to congratulate Dr. Howard on the technique he has devised for hematoma. It is a frequent affection, occurring among boxers, and particularly among the insane. I see the cases at the New York Athletic Club, but rather more frequently among the insane. I don't know why the prevalence in dementia unless it is because of low blood pressure and low vitality causing possible degeneration of the blood vessels, as Dr. Howard suggested. I have been Attending Surgeon at Central Islip State Hospital for the Insane, where there are five to six thousand patients, for the last 21 years. However, I don't treat them so much now myself, for they are looked after by the staff, while I do the major surgical work. I have never seen Dr. Howard's technique, it being new of course, but I shall certainly employ it in my next case, and also at the state asylum. The scar that may result is practically negligible, and especially so in the cases Dr. Howard presents. The boxers are not interested in beauty shows, nor are the insane, so that is not a detriment to the operation. I find that the boxers cases heal more kindly than do the insane ones, for in the latter group the vitality is not so great as in the average patient. Many of them have a general cyanosed condition and when they suffer hematomas,—which are very large at times, unless attended to very promptly, they often leave great deformity. Traumatism may be an etiological factor in the cases as these patients are confined together and often have altercations and box and cuff one another over the head and ears.

DR. J. D. WHITHAM: I have been connected with the King's Park Hospital for the Insane for the last seven years and have seen 15 to 20 of these cases. They strike or hit their heads against the bed pillows or mattresses. It usually occurs in the violent cases and is the result of trauma. We have used a method of treatment which gives almost perfect results, when infection or organization of the clot has not taken place. A crucial incision is made in the swelling and the clot is evacuated, the ear and surrounding tissues anointed with vaseline, a small rubber tube inserted into the wound, a metal strip cut to fit the outline of the auricle and laid in place; the entire auricle is then encased in plaster of Paris, the rubber tube being removed while the plaster is hardening, to prevent its being fixed. The whole affair is then covered with a bandage. The next day the outer half of the case is removed, the wound dressed, and the cast and bandage replaced. This is continued for one week. Dr. Howard's method is original and much less troublesome and I shall take pleasure in trying it.

The Modified Radical Mastoid Operation for the Cure of Chronic Otorrhea. Dr. Hugh B. Blackwell.

(Appears in full in this issue.)

DISCUSSION.

DR. HOWARD (closing): I was very much interested in Dr. Davis' discussion concerning the experience with insane patients and in Dr. Whitham's method of treatment. I have seen a similar method described in the literature, dealing with similar cases—using plaster of Paris casts, etc. I had the impression that the plaster of Paris would tend to absorb the secretion from the wound. The collodion dressing, of course, is impervious to moisture. You don't cover the wound, but only the ear, and it maintains the tissue in apposition, and the fluid that exudes does not affect the covering at all. You can see it each day and

treat it. I have not used the method described by Dr. Whitham. A cast is not essential to the success of the "window operation" and often it is preferable to apply a firm wad of gauze to the outer surface of the auricle and kept in place by vertical strips of adhesive plaster attached to the ear. When the posterior surface of the cartilage is involved, as shown by edema, pain, tenderness, etc., a window of cartilage may be resected through the original window and drainage obtained in this way, a procedure I employed successfully in one of my series; in reality, a subperichondrial resection of the auricle.

DR. H. N. SCHEER: May I add a few words of commendation on this very excellent paper? Dr. Blackwell has demonstrated the value of this operation not only in his own institution but outside of it. We in the Manhattan Eye, Ear and Throat Hospital on Dr. Page's service have been stimulated by him through Dr. Page, who is an enthusiastic advocate of this type of operation. We have performed it on several dozens of cases within the past five years, and have found it to be just as Dr. Blackwell states. Of course, it has to be applied in a selected type of case—where the patient is a child or youth, where the destruction in the middle ear does not indicate a radical operation, and where the deafness is not very marked. At present I have about six cases which come to the clinic at about three months' interval: four of them are completely dried, and two are still moist. The patient cares most for the clearing up of the moist ear. That is our experience at the clinic. When the ear remains moist after operation they are most discouraged, for it is not the deafness that brings them to the clinic. The operation is used where the deafness is not extremely marked, but if we don't succeed in getting them dry with the modified radical they come back to have something further done for them.

DR. J. D. WHITHAM: I would like Dr. Blackwell to tell us more definitely when he has ever had such an experience as this: I did a modified radical after I had read his former paper, and following the operation a membrane formed which replaced that portion of the posterior canal wall which had formerly been occupied by the flap, so that looking into the ear you would not think any operation had been done at all; but if you touched it with a probe you could readily see the membranous character of the posterior canal wall.

DR. CLARENCE H. SMITH: I have done this operation, I think, about 20 times, with very favorable results as a rule. This morning I saw a young woman who is my star modified radical patient. Her occupation was that of a stenographer, which of course made her hearing function important. She had a very fair hearing in the affected ear before operation, hearing a low whisper at 6 feet. She had had a chronic discharging ear for a year and had been under different methods of treatment. She had polypi, which was not very encouraging at the outset, but on account of the good hearing I did a modified radical operation. The results were ideal, the perforation, which was about one-third of the drum, closed over, and the ear has been perfectly dry since the operation, which took place 18 months ago. On testing her hearing today she could hear a low whisper at 25 feet. Of course that was an ideal result, and all are not so good; but one case like that is worth a good deal of effort.

DR. BLACKWELL: After a modified radical mastoid operation is performed and the wound is healed with an epidermatized antral region which communicates freely with outside air per new canal, any moisture which may be present coming from the middle ear is of relatively little importance and has no surgical significance. It is usually intermittent, nonodorous and mucus in type, it is unnoticed by the patient and noted only by the otologist.

As regards the indications for this operation, I thought I made this point clear in my paper. I might say in addition that my tendency has been to constantly extend the field for this procedure in chronic otorrhea only, reserving the radical operation for those cases in which there is practically no hearing or who have intracranial complications.

As to the growth of what is apparently a secondary drum membrane in the antral region, which is sometimes observed following the radical or the modified radical operation, this seems to be a primitive effort on the part of Nature to restore drum membrane, very similar to the regrowth of a synovial membrane in a joint which has been excised. This secondary drum membrane, which

appears only when the antral abscess has healed, is probably a misdirected effort on the part of Nature to restore the drum membrane when once the cause of its destruction, the antral abscess, has been eliminated.

New Vestibular Complexes for Localization of Brain Lesions. Dr. Lewis Fisher.

These were presented based upon an analysis of 139 verified brain lesions. The lesions were: 43 supratentorial, hemispheric tumors, 22 midcentral tumors, 37 cerebellar tumors, and 37 cerebello-pontile-angle tumors. An attempt was made to solve certain problems, such as: 1. Findings indicative of a brain lesion. 2. The value of vestibular tests in the determination of increased intracranial pressure. 3. Findings indicative of a supratentorial and subtentorial lesion. 4. Findings indicative of the laterality of the lesion. 5. Vestibular group-findings diagnostic for each anatomic area. 6. Differential diagnostic signs between various anatomic areas.

Of the findings indicative of a brain lesion, spontaneous vertical nystagmus, poor pelvic movements, marked disproportion between nystagmus and vertigo after-turning, loss of responses from the vertical canals with good responses from the horizontal canal, perverted nystagmus from either the horizontal or vertical canals, and disassociated movement of the two eyes after stimulation, were among the most important findings.

It was found to be impossible to diagnose the presence of generalized increased intracranial pressure by means of the vestibular tests.

The presence or absence of symptoms of seasickness as a result of ear stimulation is most important in differentiating between a supra- and subtentorial lesion. Cases of subtentorial lesions are never disturbed by the tests.

Tables were presented then showing the groupings of the findings in lesions located in the various anatomic areas. One very important table was for lesions located at the junction of the temporo-parieto-occipital lobe. This new complex is particularly important because the findings largely simulate those seen in cases of cerebello-pontile-angle lesion, and they are as follows: 1. Susceptibility to stimulation—absent. 2. Past-pointing uniformly good. 3. Spontaneous nystagmus absent. 4. Pelvic girdle movements good. 5. Nystagmus after-turning normal. 6. Vertigo normal, or slightly subnormal. 7. Vertical semicircular canals impaired. 8. Perversion of horizontal canals' responses absent. 9. All vestibular fibres (vertical and horizontal canals) on the side opposite the lesion show impairment, or absence of function, with hearing on that side normal. As the lesion is located more posteriorly and becomes more definitely occipital, this characteristic becomes less evident in proportion.

The following conclusions were made:

1. A brain lesion usually shows abnormal vestibular-test-findings.

2. Generalized increased intracranial pressure, such as cannot be diagnosed by the vestibuuar tests.

3. The vestibular findings indicative of the laterality of a lesion are definite and reliable, when present; but not all brain lesions exhibit these signs.

4. The vestibular tests can usually differentiate definitely between a supra- and subtentorial lesion.

5. Each anatomic area presents vestibular group-findings of its own.

6. While in the vast majority of cases the diagnosis of brain tumors can be made by the vestibular tests, their value would be greatest when taken in conjunction with the general clinical findings.

DISCUSSION.

Dr. Randall Hoyt: To me the great beauty of Dr. Fisher's paper lies in two facts: first, the consistency of his findings with what we know of the anatomy of the vestibular mechanism when it is regarded in its entirety; and second, the fact that he utilizes the method of disassociation for his diagnoses—which, after all, is the basis of all neuro-diagnosis. Of course it would be absurd to try to discuss everything he said, but a few points come to my mind.

We know that there is one secondary vestibular pathway from Deiter's nucleus to the ocular nuclei, and another secondary pathway from Deiter's nucleus to the spinal cord; consequently, it is not at all surprising that tumors

in the upper or lower ventricular region should cause disassociations between past-pointing and nystagmus.

He also mentioned a loss of vertigo, especially in some of his cerebral cases. We know that vertigo is a sensation, and it must be regarded as an explosion of the physiological activity of the cerebral cortex; and, consequently, that the cortical tumor should be characterized by an absence of vertigo after rotation is not surprising.

Again, he speaks of the sensitivity or lack of sensitivity of subtentorial lesions: We know that there is a well defined bundle of neurons which passes between the nucleus triangularis of the vestibular nerve and the nucleus of the tenth nerve. It is over that bundle of neurons which the splanchnic or gastric reflexes take place. In a subtentorial tumor where there is pressure, it is to be expected that there will be a loss of function of that bundle, and that such cases will be less sensitive to vestibular tests than the supratentorial tumors.

He brings up another interesting point: I noticed two classifications of the cerebellar cases; one of them was obviously the tumors which were primarily external to the cerebellum and arising in the angle or from the vestibular nerve and extending onward to the cerebellum—and in those he had vestibular growths; his intra tumors gave another picture, and I think the explanation of these is rather more complicated than some of the other findings. We know anatomically that there are, as a matter of fact, very few vestibular impulses which reach the cerebellum, there are a few neurons which go directly. There is also a small bundle which extends from Deiter's nucleus to the roof nuclei of the cerebellum; but I have always had the impression that these abnormalities which follow vestibular stimulation and which are caused by cerebellar tumors are due to a block of these impulses which we call the proprioceptive impulses which arise from the muscles, joints and tendons and those parts which react to vestibular stimulation. Rotating from the vertical planes of the head causes falling, and there are muscle, joint and tendon impulses which (are conveyed in part to the cerebral cortex by the dorsal columns of the spinal cord, the median fillet, the thalamo-cortical radiation and, in part, to the cerebellum. Thus, the dorso-spino-cerebellar pathways convey proprioceptive impulses arising in the opposite sides of the body to the cerebellum via the inferior cerebellar peduncle; whereas the ventral spino-cerebellar pathway conveys homolateral impulses to the cerebellum via the cerebellar peduncle. That cerebellar tumors could involve these large pathways and produce abnormal reactions to vestibular stimulation is very possible). And I find that they are due to a block of these impulses rather than to a block of the vestibular impulses themselves.

The perverted nystagmus that he speaks of—conjugate deviation of the eyes—is also very interesting to me, because whereas we know that the deviatory component of nystagmus is due to a vestibular stimulation, the other we don't know so much of. He regards the return component as due to the control arising in the cerebral cortex,—and here again he has a basis for some of his perverted nystagmus cases.

I have been very much interested in this paper. It is one of the most interesting I have ever heard—not only because it introduces a method of diagnosing brain tumors, but to know that vestibular stimulation is applicable to the diagnosis of general neurological disorders. I have been using vestibular stimulation in my syphilis clinic at the Skin and Cancer Hospital for 10 years, and find many of the findings that Dr. Fisher described. I find this dropping out of the vertigo, especially that which follows rotation in the vertical planes, in his type of cases. We had a woman, about 40 years of age, who had received intensive treatment for syphilis and her blood became negative. She was to all intents and purposes well except that she complained of nervousness, but being near the age of the menopause we thought we had an explanation for that. We gave her a detailed neurological examination; it was negative except the dropping out of vertigo following rotation in the vertical plane, and although her blood remained negative, spinal fluid examination made on the basis of this single finding continued to be positive through 47 subsequent examinations. I have run across that a number of times and if it indicates, as I believe, a cortical lesion, you can see its importance in early syphilis. It is a possible method of getting in ahead of

processes. Dr. Fisher has given me the first bit of evidence that I have ever found,—something that you can pick up in your hand and look at.

I have also found another very peculiar reaction of rotation, that is, the consistency of psychic reactions to various types of rotation. When you rotate a person through the horizontal plane, if not too much, you almost invariably get euphoria as a psychic reaction. He opens his eyes, and suddenly laughs. Now, we know that these euphoric states are induced by what is called double association, and we have this following rotation through the horizontal plane. When the patient's eyes are closed he has a definite feeling of returning; when he opens his eyes he is not rotating and he has two opposite sensations at the same time, and the result is almost invariably ephoria. When you rotate a patient through opposite planes, this has to act in the opposite way, and you get the opposite reaction—fear and distress; fear and apprehension disappear and are replaced by disguest. The patient sits forward with his head bowed, waiting and praying for the ordeal to be over. I have seen many cases in which variations of these reactions, either their intensification or their diminution will settle the diagnosis between the anxious and the depressed forms of psychoneurosis. It shows that many of these psychic conditions have more organic background than is appreciated.

I have also seen this in cases where there is no reason to suspect the sensitivity or lack of sensitivity, suggesting various chronic states of the vagus nerve; and I have seen thyroid cases, cases of hyperthyroidism, where the vasomotor reactions of sweating, etc., are intensified. I could go on for hours on this subject, for I am very enthusiastic about it, but I wish to thank Dr. Fisher again for all the information he has given me.

Dr. C. H. Smith: The point brought up by Dr. Hoyt about the explanation of the so-called cortical correction, recalls to my mind a statement made by Dr. Barany when here six years ago: He could not explain the so-called cortical correction. He had a case that was proved later at autopsy to have a loss of most of the cortex, and yet that child on stimulation gave a perfectly normal nystagmus in both directions.

Dr. John Guttman: We all pay close attention to statements made by Dr. Fisher regarding neuro-otology, as he and his book have contributed a great deal to the understanding of the function of the labyrinth by American otologists. There are, however, a few statements made that need further elucidation. While oblique nystagmus may be considered pathognomonic of intracranial affections, vertical nystagmus may be found also in perpheral affections of the labyrinth.

The girdle symptoms in cerebellar affections may be explained by the fact that in cerebellar affection often a co-ordinated movement of trunk and lower extremities is disturbed.

Dr. Fisher believed that a patient who after a mastoid operation showed a normal reflex from the horizontal canal but no reflex from the vertical canals as suffering from an intracranial disease; why could not syphilis be considered as responsible for these findings, since it is known that in hereditary syphilis a difference in the response of the reflexes in the horizontal and vertical canals is not infrequent?

Dr. Fisher (in closing): I was very glad to hear Dr. Hoyt explain so many of the neurologic aspects of the vestibular tests. It is not always safe for an otologist to venture into the field of neurology or attempt to trace new vestibular pathways. However, there is no reason why we should not profit from the work of others and those more qualified to investigate, and utilize whatever knowledge of the nerve pathways can be obtained as a result of such investigation, and utilize this knowledge in the attempt to explain some of the phenomena observed during an examination. The subject presented this evening, however, was not an attempt to explain any of the findings obtained, but rather a statement of things observed. Thus, I cannot explain why a case with a subtentorial lesion will not be made seasick from ear stimulation, whereas a case of supratentorial lesion will be made seasick by such stimulation; but I am content to know that one type of case does and the other type of case does not, therefore whenever I have a patient in whom I suspect a brain lesion, such as

abscess, etc., and who upon examination exhibits nausea, pallor and vomiting induced by the tests, I know that it is safe to exclude the possibility of a cerebellar lesion. To be sure, the number of cases observed has to be large enough before we can accept such facts as a guide, but getting a hint in the first instance from a small number of cases, it is surprising how soon the number mounts up, and before long we find a considerably large number from which deductions can be drawn.

The possibility of utilizing vestibular tests in the study of the various aspects of syphilis is of course an interesting one. Unfortunately I was unable to study a sufficiently large number of cases from which I could draw reasonable inferences, but I think it offers an exceedingly promising field for some investigator of the future.

Dr. Guttman's suggestion about syphilitic involvement of one portion of the labyrinth opens up an interesting field for speculation. I personally do not know of anyone who has demonstrated by means of histologic studies, or any other studies, that syphilis can single out one or two of the semicircular canals and affect them without affecting at the same time the rest of the labyrinth. Any attempt to explain abnormal findings on the basis of such an isolated syphilitic involvement of the mechanism is not safe nor reasonable. On the contrary, if we are to assume a syphilitic involvement of the inner ear we should expect all the portions of the ear to be involved to some extent; with the cochlear part suffering first and most. From my own experience I find it safe to conclude that whenever a case presents the picture of a loss of function from the vertical semicircular canals, but cochlea and horizontal canal intact—we are dealing with a case of intracranial lesion, and usually a tumor or "mass lesion".

SECTION OF LARYNGOLOGY AND RHINOLOGY.

February 27, 1929.

WENDELL C. PHILLIPS (Past Chairman: This is an unusual occasion and I feel greatly honored to be selected as one of the guests of the Section. It was a very gracious thing to do. You have a long programme and I will not tell you any stories nor place any laurel wreaths on the head of your distinguished Chairman, but no man could come to a meeting of this kind and under these circumstances without doing a little reminiscing. It is said to be a dangerous time in a man's life when he begins to reminisce, but I cannot help doing it tonight. I remember when this Section was organized, and was present at its birth. The Academy appealed to the New York Laryngological Society, a private society, to merge into a section of the Academy, and this was done—I cannot tell how many years ago. Then the years went by, and the Otological Section was formed. It may interest you to know that after consulting with a number of our otologists, I secured the necessary number of signatures and did the details of the work which resulted in the formation of the Section of Otology of the New York Academy of Medicine. The New York Otological Society did not follow the wake of the New York Laryngological Society for that Society is still in existence; but the history of these Sections, and particularly of this one, means to a very large extent the history of laryngology and otology in this country. I am not sure in what year I was Chairman—I think it was 1900. So I can look back with considerable pride upon the achievements of these Sections. If I had the time, I would tell you younger men some of it, and give you some of the ideas I have as to the life of the physician and the life of the specialist—but I am not here now for that purpose. I may some time ask to read a paper before this Section and present some of the ideas I have before I pass off the stage of action.

Report on Three Cases of Lung Abscess Cured by Bronchoscopy. Dr. Morris S. Bender.

Case 1: S. B., a male, age 31 years, was admitted on Nov. 12, 1926, at Mt. Sinai Hospital with a clinical diagnosis of lung abscess. The tonsils had been removed under ether anesthesia 17 days prior to onset of present illness. Seven days after operation the following symptoms developed: Foul breath, generalized body pains, most marked in chest, a dry cough, but no sputum, profuse sweaths and temperature. When admitted to the hospital, he was expectorating foul-smelling sputum. The temperature ranged as high as 104° F., pulse, 116, and respiration, 28. Physical examination revealed in area dullness, with numerous coarse crackling rales at the right upper lobe, interscapular regions, the sputum was negative for TBC and showed long chain sterptococci. The Roentgen ray examination showed a right upper lobe area of infiltration. First bronchoscopy, Nov. 15, 1926. Bronchoscope passed under local anesthesia, 20 per cent cocain with adrenalin. There was a small amount of mucopurulent secretion seen coming from the posterior division of the upper lobe branch. "No foreign body found." Suction aspiration, with irrigation, performed. Patient was again treated on Dec. 12, 1926, and final treatment on Dec. 21, 1926, at which time he was pronounced cured.

Case 2: J. B., a man aged 31 years, admiitted in June, 1926, at Mt. Sinai Hospital with a clinical diagnosis of lung abscess. In April, 1926, he developed pneumonia of right lower lobe. Six weeks following his pneumonia, the following symptoms developed: Foul breath, productive cough, with a foul-smelling, blood-tinged, yellow, thick, purulent sputum, profuse sweats, temperature ranged between 98° to 100° F. Physical examination revealed a right lower lobe abscess. The Roentgen ray examination confirmed this finding. The sputum was negative for tubercle bacilli. First bronchoscopy, June 12, 1926, showed a large amount of thick, creamy, yellow pus coming from the posterior branch of right lower lobe. Suction aspiration, with irrigation, performed. Additional bronchoscopic treatments carried out on the following dates: June 19, 1926; July 1, 1926, and July 15, 1926, at which time very little secretion was present and the patient was advised to take a rest cure. He returned in August, when he was again bronchoscoped and was pronounced cured.

Case 3: L. S., a man aged 45 years, a fruit peddler, was admitted on June 6, 1928, at Mt. Sinai Hospital, with the clinical signs and symptoms of a lung abscess. His previous history and illness had no bearing on his condition. Ten days following a hemorrhoidentomy under ether anesthesia, the following symptoms developed: Cough, fever, foul-smelling sputum and profuse sweats. The temperature ranged from 101° to 104° F. The sputum was negative for tubercle bacilli. Physical examination revealed signs of lung abscess of right upper lobe. The Roentgen ray showed a large cavity of right upper lobe from first to third rib, anteriorly surrounded by a dense infiltrated lung, and beneath this was a second cavity; both showed a fluid level. On June 6, 1928, first bronchoscopy was performed. Acrid-smelling pus was seen coming from right upper lobe bronchus. The bronchial lumen was narrowed by swelling of the mucosa from the lower lip of lumen with a mass of pedunculated granulation tissue arising from this area was removed. The pathological report was inflamed tissue—suction and irrigation was applied. About 360 c.c. of purulent sputum was raised daily at this time. June 21, 1928, bronchoscopic treatment given, a large amount of purulent secretion aspirated and cavity again irrigated; also on June 24 and June 30, with a marked decrease in the amount of secretion. July 4, there was an acute acerbation of symptoms, accompanied by a profuse productive cough, foul sputum and temperature. Bronchoscopy and suction irrigation was again carried out on the following dates: July 5 and 18, Aug. 30, Sept. 10 and 26. During this period patient improved continually as an ambulatory patient. On Oct. 1, 1928, patient was again bronchoscoped and at this time a large pedunculated mass about the size and shape of a lima bean, pale gray in color, arose from lower lip of bronchial lumen and acted as a valve, almost closing up the lumen. This mass was removed and a small amount of purulent secretion was aspirated. Suction irrigation carried out and stump of tumor mass cauterized with 10 per cent silver nitrate. Pathologic

report was inflamed granulation on tissue. Bronchoscopic treatment again instituted on Nov. 6, 1928, and on Dec. 6, 1928. No secretion was present—patient was discharged cured. The Roentgen ray examination at this time showed the cavities completely disappeared and almost complete disappearance of infiltration. Jan. 15, 1929, patient was again examined and there were no signs of abscess—he feels well and has gained 45 pounds in weight.

Summary and Comments: From the three reported cases, it is of interest to note the variance of etiologic factors in the production of lung abscess.

Bronchoscopy is a readily available therapuetice procedure and can aid in the cure of lung abscess, rather than wait for the expectancy cure, which many times makes prognosis grave. In two of the cases reported, symptoms of abscess appeared within seven to 10 days following operation; this is about the usual time.

We find that best results are obtained by bronchoscopic treatment if carried out as soon as the diagnosis is made. High fever is no contra-indication for treatment. In fact, patient seems to improve almost at once. The irrigation fluid used at Mt. Sinai Hospital is an aqueous solution containing ¼ per cent Phenol and about ½ per cent Lugol's iodin solution.

Case of Osteoma of Antrum. Dr. L. Kleinfeld (by invitation).

Past History (gathered from previous admission to hospital, January. 1928: Asthma and chronic bronchitis, chronic arthritis, anxiety neurosis. Laboratory examination, including Wassermann, B. P., urine, basal metabolism, X-ray of chest and spine, essentially negative. After discharge from hospital he had his tonsils removed.

May, 1928: Patient began to complain of pain in face. X-ray showed osteoma of right antrum.

Operation: Caldwell-Luc. Local anesthesia. Findings: Bony mass, about ½-inch by 1¼-inch, growing from floor of antrum, almost completely filling antrum. Mucopurulent secretion in antrum. Procedure: Removed with mallet and gouge.

Present Status: Complains of pain both sides of face, although pain seems to be diminishing. Loose piece of bone on floor of antrum. X-ray: Sequestrum of hard palate on right side, left antrum cloudy (the latter was punctured, return clear). Prognosis probably will be able to remove sequestrum shortly through nasal opening or Luc.

Resume: Osteoma of antrum.

DISCUSSION.

Dr. C. J. Imperatori: It is a privilege to be called upon in this discussion. At one time I was an Associate Attending Physician at Mt. Sinai Hospital and know the splendid work that has been done there on lung abscess. In fact, many years ago this method of treatment was brought out by the Mt. Sinai group. In discussing this phase of the work, I agree with Dr. Yankauer that this type of post-tonsillectomic abscess is due to some foreign body—it may be only mucus, but undoubtedly a foreign body. Usually these cases will recover with one or two bronchoscopies.

Case of Squamous Cell Carcinoma of Nasopharynx. Dr. L. Kleinfeld (by invitation).

D. L. (297456), age 40 years. Past History: July, 1927: Bleeding tumor of uterus; treated with radiotherpay. Said to have been fibroids.

Present History: December, 1927: Masses on both sides of neck, nasal obstruction and discharge. Gradually increased until admission. December, 1928: Admitted to Mt. Sinai Clinic.

Examination: Many large cervical glands; small mass in adenoid region, about one-fourth inch in diameter, harder than adenoid tissue, which bled on being probed. Specimen removed through Yankauer nasopharyngoscope; reported squamous cell carcinoma. About a week later, Dec. 8, admitted to Mt. Sinai Hospital. Three radium needles inserted into mass for 22 hours (pulled out by patient). Total, 300 m.g. hours received over a period of three months.

X-ray Therapy: 140 per cent E. D. through three fields to nasopharynx; plus 140 per cent E. D. to sides of neck; plus 100 per cent E. D. to mediastinum (prophylactic).

Present Status: Nasopharynx clear. Glands of neck gone, except right submaxillary (?). X-ray of chest negative.

Prognosis: Too early to hazard prognosis.

Resume: A very small squamous cel carcinoma with extensive cervical gland metastases, which is apparently very radio-sensitive.

DISCUSSION.

DR. F. M. LAW: It is perfectly evident that it is a bony growth in the antrum, the first I have seen.

DR. L. T. LEWALD: I have never before seen an osteoma in the antrum, though I have seen them in the frontal sinuses. They seem dense enough to cast a shadow, which could not be mistaken for a polypoid growth. I have seen several cases of that kind, but the tumor was not as dense as this, so I think one can make this diagnosis of osteoma with a good deal of certainty.

DR. A. S. EGGSTON: I cannot add anything to what was shown on the slide, and a diagnosis upon the lantern slides alone would not be very convincing. There may be some difference of opinion as to whether that is a squamous cell carcinoma or some other type. I am inclined to think it is not so much a squamous cell as of an endothelial type of growth. A variety of mixed tumors occur in this region and this is probably one of these tumors.

DR. G. ALLEN ROBINSON: Dr. Kleinfeld has presented a very interesting case. It is to be classified, I believe, as an endothelioma or transitional epithelioma. The lesion is characterized early by a small primary mass, and early and large metastatic nodes. The tumor is radio-sensitive.

DR. KLEINFELD (closing): I would merely say that in spite of the clinical and radiographic evidence of its being a so-called Schminke tumor, Dr. Gross in going over the evidence with me insists that it is positively a squamous cell carcinoma.

Lateral Cervical Fistula. Dr. Rudolph Kramer.

This patient was presented by me before this Section in November, 1925. Her history up to that time was as follows: In May, 1923, tonsillectomy under local anesthesia had been performed because of numerous attacks of acute tonsillitis. No abnormalities were noted before or after operation, except that her tonsils were enlarged, cryptic and buried, and the wound in the right side did not heal up after operation. She was much annoyed by discharge of pus. Three weeks after operation, a tender swelling appeared above the right sternoclavicular joint. This ruptured a few days later, allowing escape of pus. From that time on, there was escape of fluid from the mouth and external orifice. At times a tender, painful swelling appeared just above the external opening. At these times very little discharge escaped externally. The discharge was thin and yellowish as a rule. Occasionally a hair projected from the orifice, and on being removed, another one grew in its place. When I saw her the first time, two years after her tonsillectomy, there was an opening 3 m.m. long and 2 m.m. wide in the right tonsillar fossa anterior to the posterior pillar and below the midhorizontal line of the fossa. A few drops of pus could be expressed from the opening. The margins were rounded and slightly elevated. The external orifice was situated 1 c.m. cephalad to the right clavicle and just over the anterior edge of the sternomastoid muscle. This opening was obliquely placed, 3 m.m. long and 1 m.m. wide, and leading into a tract directed upwards, outwards, and slightly backwards. A drop of thin, yellowish fluid was present in the orifice and a single, slender, black hair protruded from it. About 2 c.m. above it, along the course of the anterior border of the sternomastoid, a small, firm, tender mass was felt. This mass was beneath the skin and not attached to it. Numerous antiseptics were tried in an attempt to obliterate the tract, but were unsuccessful. X-ray of the tract after the injection of bismuth and oil showed a continuous passage running from the tonsillar fossa downward laterally and then forward to the external orifice.

There were several irregularities in the tract; one large one near the lower end corresponding to the region of the swelling in the neck; another one near

the upper end of the tract, where there was an angulation, showed several indentations in its outline and an upward-directed offshoot. Four days later the patient had an abscess of the neck along the course of the fistula. This was opened and drained. The wound healed in two weeks. Following operation, the patient's condition was the same as when she was first seen, except for the scar of the external incision and a slight displacement downwards of the external orifice. At the time of presentation two hairs could be seen protruding from the cutaneous opening. The patient persistently refused operation and at the time of her first presentation I stated that I was going to employ trichloracetic acid. In January, 1926, two applications, at weekly intervals, of trichloracetic acid through the internal orifice by means of a cotton-wound applicator. Ten days after the second application the pharyngeal opening was closed and there was no discharge from the lower end. In June, 1926, there was an abrasion about the external orifice. The patient stated there was a discharge of pus from this region, but no evidence of pus was found upon examination. In July, 1926, the patient was perfectly well, except for the fact that a few hairs had appeared in the scar of the external opening. These persisted until the end of November, 1926, when trichloracetic acid was applied to the surface of the scar. From that time on her tract has been closed and she has had no evidences of recurrence.

Orbital Abscess Following Ethmoiditis; Intranasal Operation. Dr. Rudolph Kramer.

M. S., male, age 13½ years, admitted to the hospital May 1, 1928, complaining of swelling and redness about the right eye. Six weeks before, he had had influenza and was confined to bed for two weeks. Felt well then and went to school. Two weeks before admission, became ill and temperature up to 101°; nose was obstructed, but had no pain. He went back to school for one day and again was confined to bed with temperature of 100°. His nose was markedly obstructed. Two days later he had pain in right eye. The next day there was edema and redness of the lower lid. This progressed and spread to the upper lid. His temperature ranged from 101° to 103°. There was a history of frequent colds and sore throat, tonsillectomy, measles, chickenpox and pertussis.

On physical examination the boy was seen to be acutely ill, febrile. There was a hemic systolic murmur at the apex. The liver edge was palpable three fingers below the costal margin. Temperature 103°, pulse 116, respirations 24. Right eye proptosed downward and outward, edema of lids, limitation of movement outward, inward and upward. Fundi normal. There was marked tenderness in the upper inner angle, where a fluctuating mass was felt. Examination of nose revealed creamy pus in the right superior meatus, purulent discharge in the posterior nares. X-ray of sinuses showed marked cloudiness of right frontal, ethmoid and antrum. There was cloudiness in the region of the right orbit, strongly suggestive of inflammation of the retro-orbital soft tissues. Diagnosis: Orbital abscess from perforating suppurative ethmoiditis, suppurative maxillary sinusitis and right frontal sinusitis. Operation: Intranasal opening of right ethmoid, sphenoid, maxillary sinus and freeing of nasofrontal duct. Intranasal drainage of orbital abscess, local anesthesia. Large amount of pus was found in the ethmoid and antrum. The orbital plate was broken through in the posterior ethmoid region and a large opening made. Pus evacuated from orbit. Immediately thereafter the globe of the eye receded and there was increased outward movement. The following day the temperature was 100.6°. Edema of the lids diminished, proptosis much less and the eye movements showed greater range. The following day the temperature was normal, there was no proptosis and edema of the lids had disappeared. The patient was discharged from the hospital one week later, well, except for some postoperative reaction in the nose.

Culture of pus showed streptococcus hemolyticus. Microscopic examination of ethmoid mucosa showed acute and chronic inflammation. The patient has been well since then with the exception of a small amount of discharge from the antrum. Although he had a cold several months ago, there was no involvement of his orbit.

This case is of interest because the orbital abscess was drained through the nose and without any extrenal incision. With the exception of a report of two or three cases from Germany about two years ago, and several cases which have been treated in this manner by Dr. Yankauer, I can find no reference to any other cases managed successfully in this way. The healing takes much less time, the after-treatment is much simpler and less disagreeable for the patient, and external scarring is avoided. One precaution must be observed, and that is that effective drainage of the orbital abscess be obtained. If the orbital symptoms do not show marked subsidence within 24 hours after intranasal operation, it would probably be necessary to resort to external incision.

Lingual Thyroid. Dr. Rudolph Kramer.

J. J., female, age 33 years, admitted Feb. 10, 1926, complaining of profuse hemorrhages from the mouth on several occasions for the past 10 years. The patient felt a mass in her mouth and her speech was impaired. Arising from the base of the tongue and almost completely filling the pharynx was a sessile tumor covered with large blood vessels. The tumor was firm, grayish-pink in color. Dr. Neuhof, whose private patient she was, proposed to do a subhyoid pharyngotomy. I suggested peroral removal of the growth by means of the cold snare, so as to prevent primary and secondary hemorrhage. The cold snare was preferred to the endothermy snare because of the fear of secondary hemorrhage when the slough separated. Dr. Neuhof magnanimously turned the patient over to me for removal of the growth. There was no evidence of thyroid tissue in the neck on palpation. Basal metabolism was normal. Operation under local anesthesia (cocain swabbed in pharynx); tumor was encircled by a large loop of wire in a Yankauer tonsil snare. The snare was gradually closed so that the time consumed in removing the growth was one hour. There was no pain or bleeding. Post-operative course was uneventful, except for slight difficulty in swallowing for two or three days after the operation. The tumor was 4.5x3.5x3.5 c.m. in diameter. Microscopic examination showed colloid thyroid tissue. Ten days after operation the patient showed definite signs of myxedema. She has put on about 40 pounds in weight since the operation, speech is thick, her tongue is large, and her skin shows the usual puffy appearance. She complains of pains in her limbs. The patient takes thyroid extract, but is rather lax about this. There is no evidence of recurrence and the base of the tongue has healed smoothly.

This case is interesting from the standpoint of the removal perorally of such a large, exceedingly vascular growth by means of prolonged application of the cold wire snare without any hemorrhage, with complete removal of the growth outside its capsule, and the absence of recurrence. This patient, as 50 per cent of the reported cases in the literature, developed myxedema after removal of a lingual thyroid. The myxedema appeared 10 days after operation in this case and was very marked.

Carcinoma of the Eustachian Tube. Dr. Rudolph Kramer.

S. S., male, age 46 years, admitted March 29, 1927, complaining of paralysis of the left side of the face for one week. A year-and-a-half before admission, paracentesis had been done for left otitis media, at which time there was a bloody discharge. Following this the patient had five paracenteses done at intervals. Seven weeks before admission, operation had been performed on his nose to clear up his ear. One week later the drum was again incised; there was no discharge. About this time he developed left facial paralysis, difficulty in speaking and swallowing. His hearing has become progressively worse for the past year. On physical examination he showed a peripheral, left facial paralysis, marked impairment of taste of the anterior two-thirds of the left half of the tongue, irregular pupils, impaired hearing on both sides; left worse than right. Examination of the left ear showed a peculiar, red, granular appearance of the drum and a great deal of thickening; no discharge. The otologist suspected the presence of a neoplasm. There was a bilateral conduction deafness, vestibule and cochlea negative.

Nose: Submucous resection had been done recently, secretion both nostrils. Nasopharynx, grayish-red, granular mass involving the left Eustachian eminence, suggestive of neoplasm. Eye: Fundi negative. Specimen removed from

the Eustachian tube showed transitional cell carcinoma. With the exception of the involvement of the left sensory, V, VII, XI and XII nerves and the local lesions in the ear and nasopharynx, general examination was negative. The patient received two courses of X-ray therapy directed towards the nasopharynx at three-month intervals. Ten months after the last treatment the patient reappeared—his condition was about the same as on first admission. Seven platinum needles, 5 m.g. each, with a filter of 0.5 m.m. platinum, were inserted into the tumor involving the Eustachian eminence by means of the Yankauer direct nasopharyngeal speculum. These were left in place 20 hours and then removed; a total dosage of 700 m.g. hours. Another series of high voltage X-ray was given to the neck, where a gland the size of a plum had developed under the upper third of the sternocleidomastoid muscle. Five months later a radium pack was placed over the gland; dosage, 10,000 m.g. hours at a distance of 5.5 c.m. At present there is no evidence of growth in the nasopharynx, the gland has completely disappeared, and the ear shows a thickened drum. There is only a residual of the original seventh nerve involvement left. X-ray pictures of the head are negative. The man may be classified as free from disease at present. This case is presented to illustrate the ease of application of radium seeds or needles to growths in the nasopharynx and the accuracy afforded in the placing of these needles by the use of the Yankauer direct nasopharyngeal speculum.

Extrinsic Carcinoma of the Larynx; Radical Operation. Dr. Rudolph Kramer.

I. A., male, age 44 years, admitted April 3, 1928, complaining of hoarseness, cough and choking in the morning for the past year. For several months after the onset of his illness he had been treated as a tuberculous laryngitis. He was then given radium externally. A few months before admission to the hospital, two of the leading exponents of laryngectomy for carcinoma refused to operate upon him because his lesion was extrinsic. On admission to the hospital, general examination was negative, except for slight dullness of both apices. His teeth were in poor condition. Examination of the larynx revealed a large cauliflower growth involving the left aryepiglottic fold, false cord, ventricle and vocal cord, for practically the entire length of these structures. The pyriform sinus was obliterated from this side. A specimen was removed for microscopic examination and was reported to be squamous cell carcinoma. His teeth were treated by a dentist and his mouth prepared for operation.

Operation: Laryngectomy, local anesthesia. Dissection from below upward. Because of the involvement on the left side, a large defect in the hypopharynx was left, making closure of the pharynx very difficult. A stomach tube was passed through his nose. His post-operative course was rather stormy because of a febrile reaction of 102° and 103°. His wound healed by primary union, except for a fistulous tract opening just above the left side of the trachea. This closed in four weeks, and the feeding tube was then removed. The patient has had some irritation of the trachea due to the lower end of the tracheotomy tube. He is perfectly well now; there is no evidence of recurrence. He has not learned to speak, as yet, but we are going to start teaching him now.

This case is of interest because of: 1. The mistaken diagnosis of several months' duration. 2. Failure of radium externally applied to affect the growth. 3. The ease and painlessness of laryngectomy under local anesthesia. 4. Freedom from recurrence or metastates 11 months after operation in a marked extrinsic squamous cell carcinoma of the larynx.

Extrinsic Carcinoma of the Larynx; Radical Operation. Dr. Rudolph Kramer.

F. B., male, age 44 years, admitted April 1, 1926, complaining of pain in the throat, pain on swallowing, slight difficulty in breathing, hoarseness and bloody expectoration for 11 weeks. There was a growth on the posterior surface of the epiglottis, occupying the greater part of this surface and extending on to the aryepiglottic folds and false cords. The growth was granular, sessile and had the typical cauliflower appearance of carcinoma. Removal of specimen, followed by laryngectomy, was advised. The patient agreeing to this, a specimen was removed, which was reported squamous cell carcinoma.

April 20, 1926: Laryngectomy, local anesthesia, T-incision, dissection from below upward. The carcinoma had perforated the epiglottis so that the prelaryngeal tissues were involved. Both aryepiglottic folds, false cords and true cords were invaded by the growth in their anterior portions. Esophagus closed, interrupted sutures, muscles sutured over esophageal suture line. Packing around tracheal stump and at both ends of horizontal incision. Packing removed four days later, moderate amount of discharge. Temperature 100° to 101° for one week. Esophageal fistula persisted on right side of wound for 10 days and then closed up. Esophageal leak down along to right side of trachea persisted for three weeks, gradually closing up; the rest of the wound united by primary union. Patient was discharged in 3½ weeks. Because of the extension of the growth into the soft parts of the neck, it was deemed advisable to give the patient a course of deep X-ray therapy. The patient has been perfectly well since operation, no evidence of recurrence, and he has gained 40 pounds in weight. He wears a tracheotomy tube with no discomfort, and has a perfectly serviceable voice, that can be heard in a large room such as this.

This case is interesting because of: 1. It is another example of the painlessness and ease of laryngectomy under local anesthesia. 2. The serviceable speech that can be obtained by a patient after laryngectomy without the use of mechanical appliances. 3. Excellent health and freedom from recurrence and metastases three years after operation for an extensive extrinsic squamous cell carcinoma of the larynx.

DISCUSSION.

DR. SIDNEY YANKAUER: Referring to the case of lingual thyroid, this procedure of using the cold wire snare and closing it very slowly is one that we formerly used for removing the tonsils; we would have a snare on each tonsil, and by turning the snare slowly the tonsil was removed bloodlessly. The procedure worked very well, for the blood clots in the vessels while the snare is being closed.

I would like to say a word about the orbital abscess. I have had a number of these cases, extending over a long period of time, and have operated on them intranasally in this same way; it is not difficult to find the opening from the ethmoid cells into the orbit and to enlarge the opening into the orbit so as to get good drainage and evacuation; the remarkable thing is the short time in which the edema subsides after the evacuation of pus; I have seen it diminish before the patient left the operating table.

DR. J. M. LORE: One of the carcinoma of the larynx cases had been seen by me at the Manhattan Eye, Ear and Throat Hospital. A diagnosis of carcinoma of the larynx had been made and operation advised. At that time the lesion was intrinsic.

It has always struck me that the classification of intrinsic and extrinsic carcinoma of the larynx was more or less an arbitrary one. It seems to me, irrespective of the extent of the laryngeal lesion, if a case does not present demonstrable metastasis, operation should receive serious consideration. Even if they are made comfortable for two or three years, a laryngectomy is more desirable than to just perform a tracheotomy. The rapidity of growth is another important consideration.

As to the orbital abscess case, I approve of the intranasal operation. Should this procedure fail, then one can resort to the external route. In these cases operation is supplemented by nasal suction or suction irrigation.

DR. A. S. EGGSTON: We have studied about 200 of these cases in the laboratory. Most of them have been rather small carcinomata. Every now and then someone will operate on an advanced or extrinsic case, but the results have not been so good. I believe Dr. Kramer is right in operating upon some of the advanced cases; every now and then someone will get satisfactory results. From my experience, I think both of these cases will recur—probably in the trachea or somewhere around the wound. Just the other day I saw a man who had been operated on seven years ago, and has been more or less free of tumor since; however, there was a nodule in the trachea, which on section showed a recurrence. One has to wait a long time before these cases can be called cured. They do get considerable relief with laryngectomy and I think

it is advisable in selected extrinsic cases. Surgery is certainly preferable to X-ray or radium.

Benign Tumor of Bronchus. Dr. Sidney Yankauer.

The patient, a man, age 30 years, was admitted to Mt. Sinai Hospital with a history of having had pneumonia three months previously, which left him with a cough and a persistent pain in the lower part of the right chest. Treatment at Liberty, N. Y., resulted in temporary relief only. Physical examination and radiography revealed the remains of a pneumonic process in the lower part of the right chest. Phrenicotomy was performed, with some relief; but the patient still coughed when he was discharged from the hospital.

The patient was again admitted to the hospital in December of last year, with symptoms and physical signs unchanged. The radiograph showed a marked elevation of the diaphragm on the affected side, such as is to be expected after a phrenicotomy. On Jan. 3 of this year, bronchoscopy was performed for the first time. Attached to the anterior wall of the right main bronchus, exactly at the site of the opening of the middle lobe branch, I found a tumor, consisting of a grayish, coarsely nodular, pedunculated mass, which completely occluded the middle lobe branch. It was removed by grasping the pedicle with forceps, and although it shrunk in size after removal, it still measured 1 c.m. in length, nearly the same in width, and ½ c.m. in thickness. Microscopic examination showed it to be an inflammatory polyp.

The mucous membrane of the middle lobe bronchus was found swollen sufficiently to completely occlude the bronchus, but from the center of the swollen mucosa a drop of pus exuded. The opening was dilated, the pus evacuated by suction, and an application of nitrate of silver was made. A brisk but temporary hemorrhage accompanied these manipulations.

Several further bronchoscopies showed no change in the local condition, so that it became necessary to remove the swollen mucous membrane, which still occluded the bronchus. This was done with punch forceps. Following this procedure the patency of the lumen was restored, the suppuration ceased and the symptoms disappeared.

At the last bronchoscopic examination, one week ago, the bronchus was found to be entirely free from secretion, but the opening was not quite as large as it should be. Further observation will be necessary to determine whether what now looks like a complete cure actually proves to be so.

The case is instructive because the phrenicotomy was performed without a previous bronchoscopic examination. It was entirely unnecessary and would have been avoided by preliminary bronchoscopy. It illustrates the statement which I have repeatedly made, and which all bronchoscopists should impress upon the internists and thoracic surgeons with whom they are associated, namely, that no diagnosis of an intrathoracic lesion is complete without a bronchoscopic examination and, further, that in general, no operation upon an intrathoracic condition is justifiable without including the endoscopic findings in the indications for operation.

DISCUSSION.

DR. R. M. COLBERT: I should like to ask Dr. Yankauer if a radiographic examination of the chest was made. Since he stated that the right middle bronchus was completely occluded, was it not possible to determine an atelectasis of lung in the radiograph?

DR. YANKAUER: There was consolidation showing in the X-ray picture which was diagnosed as unresolved pneumonia, but which was undoubtedly an atelectasis, as proved by the pathology of the case. I have not taken a radiograph since the case cleared up, but will do so to complete the record.

Case of Basal Cell Carcinoma of Antrum With Metastases. Dr. L. Kleinfeld (by invitation).

H. F. (294198), age 35 years. History: July, 1927: Right-sided epistaxis and foul nasal discharge. October: Operation on right side of nose, done elsewhere; large amount of tissue removed. December: Admitted to hospital. Examination: Right side of nose filled by mass which bled on being palpated. X-ray: Cloudy right frontal, ethmoid, antrum; mass filling right nostril. Specimen: Reported basal cell carcinoma.

Operation by Dr. Yankauer; gas and ether anesthesia. Findings: Antrum full of carcinomatous tissue. Procedure: Modified Moure through cheek; wound left open for inspection and treatment. Specimen: Basal cell carcinoma.

Therapy: 1. Tubes of radium salt; 3,200 m.g. hurs. 2. January, 1928, X-ray, crossfire over antrum; full cycle of 12 treatments over three weeks.

Course: April, bilateral submaxillary glandular enlargement observed. This was treated as follows: X-ray, full dose both sides. July, hemoptysis, pain in chest, cachexia. Patient admitted to hospital. The following note was made: Examination: Infiltration, both upper lobes; large glands, submaxillary, axillary, epitrochlear. X-ray showed metastatic tumors in lungs. Therapy (September): X-ray, full dose to neck and chest. Died a few months later.

Resume: Basal cell carcinoma with metastases. This case is presented because of the extreme rarity of metastases from a basal cell carcinoma.

Irrigation of Antrum in Infants and Children Through Natural Orifice. Dr. Irving B. Goldman.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

Irrigation of Antrum. Dr. Sidney Yankauer.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. IMPERATORI: Dr. Yankauer is to be congratulated on devising this instrument. He omitted to mention that the Killian instrument is sharp and right-angled, and that is what makes it so dangerous. My experience with Dr. Yankauer's cannula is that in about 40 or 50 per cent of the cases the antrum can be catheterized through the natural opening.

DR. M. C. MYERSON: I did not know anything about the orifice cannulae in this country until I began to work with Dr. Yankauer. So far as I know, there are three types of natural orifice cannulae available, the Yankauer and the Haskins—which are double, one each for the right and left—and then there is the cannulae of Pierce, of Chicago, which can be used on either side. It would be well to have all these cannulae and see which best suits the individual. For my own part, using the Yankauer and the Pierce cannulae, I can say that I can enter 90 per cent of the orifices; this is provided I have the time and patience that some of the difficult cases entail. That means that I will anesthetize and wait, and then try the cannula, and reanesthetize if necessary; but if you take the average patient and the time that we would spend in studying the position of the orifice and the local anatomy, 60 or 70 per cent would be about right.

DR. I. M. HELLER: I have used the Pierce cannula since it came out. The difficulty I find is that the curve is parallel to the handle and not at right angles, as is Dr. Yankauer's. That means that if you have a middle turbinate with a slightly deflected septum, you can get into the middle meatus with the Pierce cannula but you cannot turn it around; it seems that with Dr. Yankauer's cannula, if you get it up there you can turn, for you are turning at right angles instead of parallel to the shank. Putting it another way, after you turn the Pierce cannula you have increased the space required between the middle turbinate and the wall, and as I have not been successful in more than 50 per cent of cases, I will get this one of Dr. Yankauer's and try it. There's no doubt that it makes a better impression on the patient if you can get in the first time than by the old route, and he comes back the second time with much more confidence and willingness than he did before.

DR. W. W. CARTER: I wish to congratulate Dr. Yankauer on his ingenuity in devising this cannula, and Dr. Goldman on his dexterity in using it. I have never had any experience with Dr. Yankauer's cannula, but from a practical point of view I have always thought it quite an advantage to have two openings when evacuating pus from the antrum. When the inferior fossa is perforated and the antrum irrigated, the solution flows out through the natural opening; this completely washes out the cavity, the discharge being expelled through the natural opening. I have had no experience with Dr. Yankauer's cannula, in using which the solution necessarily passes out through the same

opening; it may be allright in children, but in adults it would seem that it would be an advantage to have two openings.

DR. R. KRAMER: I have been using the new cannula which Dr. Yankauer showed and wash out between 20 to 25 antra in a morning in the office. That shows how simply and easily it can be done. The objection Dr. Carter makes does not hold; in fact, you can wash out the antrum and wash it clean; you can go in afterward and find it clean. The proceeding is absolutely painless, and the patient does not have any of the fear that he has with the puncture method, and there is no difficulty in getting them to return for further treatment.

DR. J. H. ABRAHAM: I also wish to congratulate my old friend, Dr. Yankauer, on this wonderful invention of his. I am glad to hear him admit that 50 per cent of these cases cannot be entered. I think all who have worked in the dead-house will appreciate that we cannot enter some on account of the anatomical structure. Dr. Yankauer seems to have forgotten some of his literature. I think, in 1901 or 1906, I presented at the Academy of Medicine two instruments, one for perforating the inferior meatus and the other for middle meatus. These instruments are still in use and are employed by me and many others, with the greatest of success.

DR. D. H. JONES: I have always been taught that it was bad to use cocain with children, and I would like to know the method which Dr. Goldman employs.

DR. GOLDMAN (closing): Naturally I was cautious when I first employed cocain in children. However, I have never seen any ill effect from using a 20 per cent cocain solution containing adrenalin.

Simplified Investigation of the Sphenoidal Sinus. Dr. M. C. Myerson.

This consisted of the presentation of a method of exploring the sphenoidal sinus with a silver probe and after this was successfully accomplished a special cannula properly marked is introduced into the sphenoidal sinus along the same track as the probe. The technique is as follows: The patient is either in the recumbent or sitting position. The olfactory fissure is anesthetized with 10 or 20 per cent cocain adrenalin solution until the anterior wall of the sphenoid is encountered. This is anesthetized. A silver probe is now passed along the olfactory fissure bisecting the middle turbinate in a horizontal plane. The anterior wall of the sphenoid is readily met and is pierced. When this puncture of the anterior wall occurs the sensation which is imparted to the fingers is unmistakable. It may be necessary to bend the distal end of the probe outward somewhat so as to have it encounter the anterior wall readily. When the probe has been successfully passed, the cannula is employed. The same relative bend is made at its distal end and the distance to which the probe penetrated the nasal chamber is noted. The cannula is now readily passed into the sphenoidal sinus.

The experience of the author corroborates that of Skillern, who states that it is practically impossible to penetrate the cribriform plate or the roof of the olfactory sulcus when using a malleable silver probe.

Difficulties and dangers are cited. The anatomical structure of the nasal cavity will decide whether this procedure can be carried out. A badly deviated septum may prevent a view of the olfactory sulcus.

Bleeding may occur if the operator is not gentle in his manipulations. The various types of cannulae for entering the sphenoidal sinus are reviewed and the question is raised concerning the necessity of using heavy, stiff, resistent trocars for this work. Due credit is given to P. Watson Williams and others, who have done a great deal of work with sphenoidal puncture.

The anatomical work of Zuckerkandl, Onodi, Loeb, Mosher, W. B. Davis, Schaeffer and Neivert is mentioned. The clinical reports of many authors are also cited to stress the importance of the sphenoidal sinus in the production of a variety of symptoms.

The author's cannula is of solid silver, malleable and nonresistant, so that it bends when it meets an obstruction. It is fitted with an end which permits the attachment of a Luer syringe. Just before this end there is a thumb plate, which serves to inform the operator of the position of the distal end of his

instrument. The instrument and the technique which it entails are advocated because of the safety and facility with which sphenoid puncture can be carried out when employing them.

DISCUSSION.

DR. A. LOBELL: I was extremely interested in Dr. Myerson's paper, and have great regard for his ability; but without any intention of being derogatory, everyone who has studied the situation thoroughly is aware of the following facts:

If the ostium of the sphenoid were always on the level with the olfactory fissure, it would be comparatively easy for anyone to introduce a probe or a cannula. However, it was established long ago that the ostium varies considerably in its location. It is for this reason that Hajek and others advocated the use of a suitable curve in order to find the ostium. The technique of this procedure is not without danger, as evidenced by authentic fatalities in the hands of reliable workers.

I cannot agree with the gentleman that the majority of the anterior walls of the sphenoids are extremely thin. Is it not a fact that we have to use considerable pressure to enter the sinuses in our operative procedures?

I contend that the sphenoid sinus is entitled to the attention we give to the antrum. Our indisputable success in the latter is essentially due to the fact that we rarely hesitate to puncture the sinus on the mere suspicion of involvement. Were we to depend on the irrigation through the natural opening, we would not enjoy the wonderful results that we do, for obvious reasons. I am convinced that we can obtain equally good results in the sphenoid if we were to seriously attempt to study the technique of puncturing the anterior wall of the sphenoid, and apply the method in those instances when we fail through the ostium. It is a safe procedure, providing we determine the capacity of the sinus by X-ray, and follow the technical steps with precision.

DR. C. J. IMPERATORI: Does Dr. Myerson infer that this is a procedure that is not preceded by previous X-ray study of the sphenoid?

DR. HARRY NEIVERT: I believe most of the men know as much about the anatomy of the sphenoid as I do. One point I desire to emphasize is that you can probe the ostium in the majority of cases, if you take the time. The true ostium of the sphenoid is bony, but it is covered to a greater or less extent by a membrane made up of a layer of sphneoid mucosa in intimate contact with a layer of nasal mucosa. The apparent opening is therefore smaller but elastic. It should be safer and easier to use a soft, pliable cannula than a rigid one.

DR. MYERSON (closing): In my presentation I tried to show that I had studied the subject before I presented it. I raise the point of whether, as the result of studies of the sphenoidal bone and sinus, the use of stiff, resistant cannulae—even with transverse bars—are perhaps not justifiable. The use of a silver probe, as I pointed out before, makes the procedure a much safer and easier one.

Intracranial Complications Following Sphenoid Infections. Dr. Rudolph Kramer.

(To appear in a subsequent issue of THE LARYNGOSCOPE.*)*

Pathological Report of Two Cases of Intracranial Complication Associated with Disease of Sphenoid Bone. Dr. J. G. Druss.

The following two cases, because of their unusual pathological interest, were selected from a series of rhinologic and otologic specimens which I had the opportunity of sectioning in the Department of Morbid Anatomy at Mt. Sinai Hospital. I shall briefly give the clinical history of each.

The first case is that of a female, age 53 years, admitted to medical service at Mt. Sinai, Feb. 23, 1928, with four weeks' history of intermittent vomiting, pain in back of head, profuse nasal discharge and hyperpyrexia. Three days prior to admission to hospital she became unconscious. On admission she was in a state of unconsciousness, with marked meningeal signs. Both nares were filled with purulent secretion. Lumbar puncture revealed slightly cloudy fluid under normal pressure—cell count, 27—all lymphocytes. Culture of fluid, streptococcus gamma. Patient ceased 12 hours after admission.

Post-mortem examination showed presence of pus in the ethmoid cells and left antrum. The sphenoid sinuses were absent.

In the body of the sphenoid bone a tract leading from the roof of the nasopharynx running upwards and backwards into the body of the sphenoid bone for a distance of about 1½ c.m. It was about 3 c.m. in diameter, except at the blind end, where it measured about 5 c.m. The cavity contained a cheese-like detritus. The sella turcica was eroded and dura over the sphenoid bone at the base of skull was thickened and lifted away from the underlying bone.

A basilar meningitis fairly well circumscribed about cerebellum, pons, medulla and midbrain was observed. A thick, yellowish purulent exudate was adherent to posterior clinoid process, displacing the hypophysis.

Serial Section of Sphenoid Bone: Sinus tract is lined by dense connective tissue strands, which are partially separated by a purulent exudate, and granulation tissue. The body of the sphenoid adjacent to the tract, particularly at the roof, is acutely inflamed. No definite fistula could be traced between the sinus tract and the pituitary fossa. The dura covering the body of the sphenoid bone was markedly thickened and inflamed. The ethmoid cells showed inflammatory changes in the mucous membrane, but the adjacent bone was not involved.

On gross examination, the first impression gained was that we were dealing with an osteomyelitic process of the sphenoid bone, the infection extending from the nasopharynx. On further consideration, the possibility of a rest of Rathke's pouch or "craniopharyngeal canal" (communication bet. nasopharynx and pituitary fossa), which had become secondarily infected, was strongly considered. The infection in all probability spread to the adjacent bone by direct extension and finally involved the dura, producing a meningitis.

In reviewing the literature, I find that Rathke, in 1839, was the first to describe a case of this type in an embryo, at which time the name Rathke's pouch was coined. Sokoloff states that a craniopharyngeal canal is found in about 0.3—.5 per cent of all adults and 10 per cent of newborn. This craniopharyngeal canal is usually completely obliterated at the end of the second or beginning of the third embryonic month. The obliteration of this canal starts more frequently at the nasopharyngeal opening than at the pituitary opening, so that if at any time this process is arrested, a tract with a blind end in the sphenoid will be produced. The opening at the pituitary fossa is found about twice as frequently as at the nasopharynx. The craniopharyngeal canal is of pathological significance, in that berniations of the brain into the nasopharynx and mouth may take place in the embryo and newborn fetus. The pathological changes in our case proceeded in the opposite direction.

Summary: This case demonstrates in all probability the rare condition of a craniopharyngeal canal with its opening in the nasopharynx. This canal became infected, the infection spreading to the adjacent sphenoid bone by direct extension, and produced a meningitis.

The second case is that of A. R., female, age 13 years, admitted to the Neurological Service of Mt. Sinai, Feb. 26, 1928, with a two-month history starting with frontal headache, stuffiness in nose, nausea, vomiting and generalized weakness, followed by temperature ranging between 102° and 105°. Mild meningeal signs and symptoms then appeared. Lumbar puncture showed eight cells, normal pressure. Nasal examination revealed presence of crusting and secretion in both nares, but a definite diagnosis of sinusitis could not be made; X-ray of sinuses showed no abnormality, operation was therefore not performed. Patient's condition declined very rapidly. She became stuporous, then comatose, and ceased seven days after admission.

On post-mortem examination, a purulent sinusitis of right sphenoid, a tremendous right frontal lobe abscess and a basilar meningitis were found.

Brain: Brain is under increased intracranial tension. Purulent exudate over the cribriform plate. There is a perforation in the gyri recti of the frontal lobe communicating with a cavity within the brain substance. On removing the pituitary gland, a perforation of bony plate forming roof of sphenoid sinus was noted. Horizontal section of brain disclosed a large, fairly well encapsulated abscess cavity in right frontal lobe, measuring about 5 c.m. in depth and about 2½ c.m. in diameter.

Microscopical Examination of Sphenoid Bone: Right sphenoid contains mucoid exudate. There is marked submucosal thickening and infiltration of polynuclear cells lymphocytes. The mucous membrane is intact in some areas, in other areas there are present huge polypi, particularly on the posterior wall. Behind the right sphenoid sinus there is present a small cavity with a perforation at the roof. It was this perforation that was noted and probed at post-mortem. Within this cavity a purulent exudate is present. The cavity is lined by mucous membrane, which is denuded in some areas. The submucosa is infiltrated with cellular elements and contains granulation tissue. The adjacent bony tissue is secondarily involved, particularly at the roof. This small cavity is in all probability an accessory sphenoid sinus, since no communication between it and the right or left sphenoid sinus could be established by serial section. The possibility of an extension of either of the sphenoid sinuses must be considered. The dura overlying the sphenoid sinus was inflamed, as was the pituitary gland.

The left sphenoid sinus and the ethmoid cells showed mild inflammatory changes. No perforation or disease was noted in the roof of either sphenoid sinus.

This case is of interest not only from the clinical standpoint, but particularly from the pathological standpoint. From the pathological standpoint, this case illustrates the exceedingly unsual complication of a frontal lobe abscess secondary to sphenoid involvement. As is well known, the majority of frontal lobe abscesses of rhinologic origin are secondary to frontal or ethmoid sinusitis. I could find only one other case of frontal lobe abscess secondary to a sphenoid disease, and that was reported by McBean (Annals of Otol., Laryngol. and Rhinol., p. 419, Vol. 23, 1914). Furthermore, this case is of special interest, in that the pathway of infection could be traced both macro- and microscopically from the sphenoid cavity through the bony roof by direct extension into the pituitary fossa, then along the base of brain into the frontal lobe. The infection by direct extension through the bone is the most common, particularly in the chronic cases. In the acute fulminating complications the spread is in all probability through the lymphatics, bloodstream or through dehiscences in the bone.

Summary: This case illustrates the unusual complication of a frontal lobe abscess secondary to sphenoidal involvement.

DISCUSSION.

DR. F. M. LAW: The diagnosis of sphenoid disease by the X-ray is very difficult and very unsatisfactory, that is if one sinus overlaps the other and one is diseased and the other clear, the clear sinus will obliterate the shadow and a negative diagnosis is the result; but, as well brought out in this paper, the most serious complication is due to involvement of the bony wall, and that can be shown with a properly made and interpreted X-ray examination. If carefully done stereoscopically, with the head absolutely immovable, the plates placed in the stereoscope will show the bony wall of the sphenoid. The character of the line is what determines the interpretation: a diseased bone will show a fuzzy, semitransparent appearance, in contrast to the clean-cut definition of the normal bone. In other words, a normal sinus bony margin will show as though drawn with a fine pen; if you take the same drawing and put your finger on it and mess it up a little—that is the appearance you get with a diseased bone—possibly of the type of osteomyelitis.

There is much work to be done on the sphenoids, and that can be done only by close co-operation between the surgeon and the Roentgenologist; if the surgeon would talk the case over with the Roentgenologist, and when they do operate, get a piece of bone and have it examined microscopically to check up with the X-ray, they would surely reach much more satisfactory interpretations of the sphenoid conditions.

DR. LEWALD: I agree with what Dr. Law has said.

DR. R. KRAMER: I would like to emphasize one point, namely, that we should be more on the lookout for these cases. Furthermore, there should be more co-operation among the specialists, for the diagnosis is not of much value unless the men keep their eyes open for this condition, study it and provide the proper therapeutic approach for it. At present we have not found it.